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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII CLEVELAND, OHIO, APRIL 14, 1904 NUMBER 15

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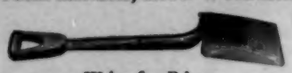

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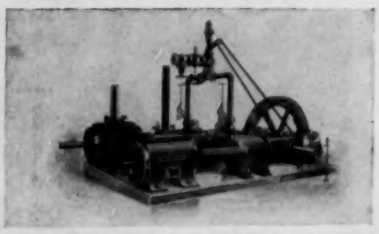

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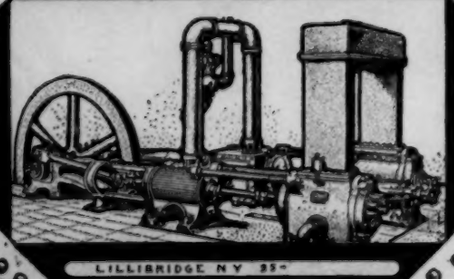

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, APRIL 14, 1904 NUMBER 15

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The pig iron needs of the United States Seel Corporation and the probable action of the Lake Superior iron ore producers at their meeting in New York April 19 are the matters of immediate moment to the iron trade. The Steel Corporation's option on 45,000 tons of Bessemer iron for May expired on April 10, but it was not exercised, neither were the Bessemer Association furnacemen notified that the iron would not be taken. The statement is made that the matter is held in abeyance. That an ore conversion deal may be made by the Steel Corporation, in case the merchant ore firms at the meeting on the 19th make no proposal that will lead to an agreed price on ore in 1904, as advocated by the Corporation, is one of the possibilities of the situation as it stands. It is understood that 15,000 tons of May iron on which an option was given by a Pittsburg firm operating Valley furnaces has been canceled; it is the remaining 30,000 tons which association furnaces were to furnish that is still under consideration. The ore meeting, which is to be a general one and not a committee meeting as in the case of the last conference in New York, was postponed from April 12. Nothing has developed in the weeks of waiting to change the general alignment of the respective elements, though market conditions are certainly more promising than when the issues involved were first discussed.

The pig iron market is quiet and firm. Stocks of iron have been reduced in the past month, with production considerably increased. Of 159 furnaces included in the statistics gathered by Central Western furnace operators, 125 were active on April 1, having 85.5 percent of the capacity represented by these statistics. The Steel Corporation had 92 percent of its capacity active at the beginning of the month, and from indications will need little outside iron after the present month, several additional furnaces being scheduled to go in before July 1. The appearance of the Clairton Steel Co. as a seller of basic pig iron is a new factor in the situation. Its surplus is expected to be 400 tons a day after May 1. An increased output of foundry iron from merchant furnaces in the Central West is a probability, if these furnaces are to run at all. In the past week the foundry iron market has shown strength under a waiting situation. Southern furnaces have sold so much iron for the second quarter that they are not pressing business, and the optimism that always appears with a slight turn in the situation is in evidence. Third quarter inquiry is talked of, but it is hardly a tangible factor yet. Foundrymen in general have little positive data as to their needs in the second half of the year.

Steel manufacturers who attended the meetings on billets, plates and structural shapes in New York last week were generally hopeful, and the reaffirmation of prices was a natural sequence of the reports sent up from the mills. Plate business is poor, but leaving out plates and rails the mills are making satisfactory bookings and are operating on full schedule. It is the lack of good assurance as to the tonnage after June that tempers all optimism. If the remainder of the year could be as March and April with the manufacturers of the various forms of finished steel, 1904 would be a good year.

Beyond a slightly lower price on bar iron and sharper competition on boiler tubes, prices have been maintained in the past week. The conference over the wage reductions in sheets and tin plate has developed a stout contest. Though the 20 percent reduction will not be accepted by the men, there is now a probability of an agreement on a compromise figure.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, April 13.

The option on 45,000 tons of Bessemer iron for May delivery which the United States Steel Corporation had with Valley merchant furnaces expired this week. The option was to have been exercised on April 10, but by agreement the matter is in abeyance for the present. This action was a surprise to the trade, as it was confidently expected the options would be taken up. It is believed in some quarters that pending ore questions have a bearing on the Steel Corporation's decision regarding pig iron. The meeting of Lake Superior ore producers was again postponed last week until Tuesday, April 19, and as the opening of the navigation season is not far off, it is not believed that there will be any further postponements. In the meantime a number of furnace companies are negotiating for their ore supply for long terms, while others are figuring on an interest in ore properties in the Lake Superior region. Thus the tonnage to be purchased from year to year will be greatly reduced, and ore prices will no longer be the factor in the iron and steel trade which they are today.

Meetings of the plate, billet and structural associations were held in New York last week and prices were reaffirmed. There was no general meeting of billet interests, the executive committee transacting all the business, and as prices are being well maintained by all members of the association little business came before the board. Representatives of the plate and structural associations which met on Thursday reported that while the volume of business for early shipments is fairly satisfactory, being larger in structural steel than in plates, the amount of future tonnage is not heavy. A meeting of the shafting manufacturers is being held in New York today, but no change in prices is anticipated.

The lull in the pig iron market continues, while the new orders in finished lines are not very heavy. Mills, however, are working pretty full and specifications on nearly all lines except plates are being freely received. The demand for tin plate is reported heavy, while the sheet trade is improving. The future of the sheet and tin plate markets will depend much upon the action of the special convention of the Amalgamated Association. No arrangement has yet been made that is acceptable to the Amalgamated Association and the manufacturers, and unless an agreement is reached a strike cannot be averted. The convention has been in session since last Wednesday and the delegates from the sheet and tin plate lodges are opposed to the acceptance of reductions of 20 percent in both trades.

The tremendous improvement in the iron and steel trade since the first of the year is indicated by the operation of blast furnaces tributary to the Lake Superior ore region on April 1. On that date out of a total of 159 furnaces reporting, 125 were in operation and 34 idle. The operative capacity was 85.5 percent, while only 14.5 percent was idle. On Jan. 1 only 31 percent of the capacity in this territory was active. On March 1, out of a total of 163

furnaces, 113 with 72 percent of the capacity were operative and 59 out, showing a gain of 12 furnaces during the month, due to a large extent to the resumption of idle merchant furnaces in the Valleys that received orders for Bessemer iron from the Steel Corporation. On April 1 the Steel Corporation had 92 percent of its furnace capacity in blast, while the Republic Iron & Steel Co. had all its furnaces in operation. The operative capacity of the merchant furnaces also increased from 58 to 72 percent. The present month will show an increase, but it will of course be not nearly as great as that of the previous months. The settlement of the strike at the plant of the Wheeling Steel & Iron Co., Wheeling, W. Va., has resulted in the blowing in of one idle stack, and the second furnace is to go in this week.

During the past week the chain manufacturers succeeded in forming a strong association, only a few small interests being outside. A new list of prices was adopted which on the whole is much the same as the previous list. The nut manufacturers are also together again and have issued a new list of prices to the trade.

Coke production in the past three months has shown a steady increase, the shipments from the upper Connellsville region during March being greater than in any month since September. The production for the month amounted to 1,014,436 tons, as compared with 848,471 tons in February and 686,029 tons in January. The production for December of last year was 427,928 tons, when the coke trade touched low mark, after one of the most prosperous years in the history of the region. Shipments for the month of March were considerably in arrears of production, due to the car shortage; the aggregate was 997,680 tons, as compared with 744,846 tons in February and 695,648 in January. The quarter's production amounted to 2,546,837 tons, against 2,993,586 tons, and the shipments were 2,438,174 tons, as against 2,957,856 tons in the first quarter last year.

Pig Iron.—There has been little buying of iron. Two lots have been taken, amounting to over a thousand tons in each case. We note the sale of 1,200 tons of basic at $13.25 Valley furnace, and 2,000 tons of forge at $13.25 Pittsburg. In the case of forge the price is somewhat lower than for some time. Deliveries in both cases are for April and May. Small lots of foundry iron are being purchased and $14 Pittsburg is quoted on No. 2. Bessemer iron continues firm at $13.35 to $13.50, furnace. The large number of new furnaces which the Steel Corporation has coming in makes it doubtful if any additional iron will be purchased this year. One of the two stacks at Donora was not blown in last week as some trouble was met at the last moment, but it is probable that both will be blown in at the same time later this month. One stack at Sharon will also come in shortly, while one furnace at New Castle, at which repairs are being made, may be available in May. One of the furnaces of the Wheeling Steel & Iron Co., Wheeling, W. Va., which was banked for nearly two months resumed last week, while the Top Mill stack which has been undergoing repairs resumes this week. The Clairton Steel Co. will blow in one of its idle stacks next week, while the new furnace will come in the week following. With these three furnaces in operation the company will have considerably more iron than it can use in its open-hearth furnaces and at least 400 tons a day will be sold in the open market. This is an innovation for the Clairton Steel Co. and indicates to what extent pig iron production, as a result of the activity in new furnace construction in the past few years, may exceed demand during normal periods in the iron trade. We revise quotations as follows:

Bessemer, Valley	$13 35 to 13 50
Bessemer, Pittsburg	14 20 to 14 35
No. 1 Foundry	14 75 to 15 00
No. 2 Foundry	14 00 to 14 50
Gray forge, Pittsburg	13 25
Chilled basic, Valley	13 25 to 13 35
Chilled basic, Pittsburg	14 10 to 14 20

Steel.—Demand for sheet bars is still heavy and a few mills are asking premiums of 25 to 50 cents a ton. At the meeting of the executive committee of the association held last week prices were reaffirmed. We make the following quotations: Bessemer and open-hearth billets, 4 x 4 inches, and slabs, up to and including 0.25 carbon, $23 Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O., 0.26 and including 0.60 carbon, $1 advance; and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheet and tin bars are $1 per ton extra. Bessemer and open-hearth rods are still quoted at $30 to $31 Pittsburg.

Ferro-Manganese.—Domestic ferro, 80 percent, is held at $42 to $42.50, delivered at buyer's mill in carload lots east of the Mississippi river.

Spelter.—The spelter market is firm and prices are advancing. Prime western grades are held at 5.18c to 5.20c, Pittsburg, in carload lots.

Muck Bar.—Practically no muck iron is changing hands, and the market is nominally $25.50 to $27, Pittsburg.

Skelp.—The market is firm and all the skelp mills are filled up to May. Grooved iron is quoted at 1.55c and sheared at 1.60c; grooved steel, 1.40c to 1.45c, and sheared 1.45c to 1.50c.

Plates.—At a meeting of the plate manufacturers held last week prevailing prices were reaffirmed. The tonnage on the books of the manufacturers was reported not very heavy, while specifications are not being received freely enough to keep all mills in operation. We make the following quotations: Tank plates, ¼ inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.85c; locomotive firebox, not less than 2.10, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Bars.—Demand for iron and steel bars is heavy and consumers are specifying freely. The market is very firm, but there is no indication that prices will be advanced in the immediate future. We quote: Bar iron, 1.40c to 1.45c, Pittsburg, for local delivery, while for Western shipment quotations are based on 1.35c, Pittsburg. Hoops are held at 1.40c base, and bands at 1.35c taking bar extras. Bessemer steel bars, 1.35c; open-hearth, 1.40c; plow beams and cultivator beams, 1.35c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.45c. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance.

Structural Material.—Specifications for structural shapes are heavy and considerable new business is being placed. The tonnage in the aggregate is far below that of the first quarter of last year. At a meeting of the structural manufacturers held last week prevailing prices were reaffirmed. We quote: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—The sheet market is active and considerable more business is being booked than for several months. The action of the Amalgamated Association convention is being awaited with interest by the trade, as the course of the market in the next two months depends entirely upon the action taken. We quote black sheets, one pass, as follows: No. 8, 1.80c to 1.85c; No. 9, 1.85c to 1.90c; Nos. 12-14, 1.95c; Nos. 15-17, 2c; Nos. 18-21, 2.05c; Nos. 22-24, 2.10c; Nos. 25-26, 2.15c; No. 27, 2.20c; No. 28, 2.30c; No. 29, 2.60c; No. 30, 2.70c. Galvanized: Nos. 12-17, 2.40c; Nos. 18-21, 2.55c; Nos. 22-24, 2.70c; Nos. 25-26, 2.90c; No. 27, 3.10c; No. 28, 3.30c; No. 29, 3.70c; No. 30, 4.10c.

Pipes and Tubes.—Owing to the heavy demand for pipe and tubes manufacturers are having much difficulty in securing skelp. The business in pipes and tubes thus far this month is equal to that in corresponding portions of the first three months this year. Discounts to consumers, carload lots f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch	68	58	66	56
½ inch	71	61	69	59
¾ to 6 inch	75	65	73	63
7 to 12 inch	71	61	68	58
Ex. Stg., plain ends, ⅛ to 8 in.	67	57	64	54
Double Ex. Stg., pl. ends, ⅛ to 8 in.	59	49	56	46

BOILER TUBES.

	Steel.	Iron
1 to 1½ inch	43½	39
1¾ to 2¼ inch	55½	38
2½ inch	58	43
2¾ to 3 inch	64½	50½
6 to 13 inch	55½	38

Rails and Track Material.—There has been little new business in rails during the week and the indications now are that the season's tonnage will fall close to 1,000,000 tons below that of last year. We quote: standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; 16 to 40 pounds, $23 to $24. Track material: Spikes, 1.65c to 1.70c.

Wire and Wire Nails.—While the new business that is being placed is not heavy, mills are operating full on orders placed some time ago and the outlook continues excellent. Wire nails, carload lots to jobbers, f. o. b. cars Pittsburg, are quoted $1.90 base; plain wire, carload lots, $1.80 base; barb wire, carload lots, $2.20 base; staples, carload lots, $2.05 keg. Galvanized, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut nails, carload lots, $1.75, and less than carload lots, $1.80, f. o. b. Pittsburg, plus freight to point of destination. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—A meeting of the shafting manufacturers is being held in New York today, but no change in prevailing prices is anticipated. We make the following quotations: Cold rolled and ground shafting 52 off in carload lots and 47 percent off in less than carload lots. Tire steel, 1.50c, base; spring steel, 1.90c to 2c; toe calk, 1.85c, base. Tool steel is quoted 6 cents and upwards, according to the grade.

Old Material.—The market is quiet in all lines and there are few transactions. Heavy melting stock continues to be quoted at $14.25 to $15, gross, and low phosphorus stock at $17.50 to $17.75, gross. Little cast scrap is changing hands.

Coke.—Demand for both furnace and foundry coke continues heavy and furnace coke for early shipment is selling at $1.60 to $1.65, while foundry is quoted at $2.15 to $2.50. During the week ending Saturday, April 2, the production of the upper region amounted to 209,345 tons and the lower region 54,608 tons. Little trouble is being experienced on account of shortage of cars and shipments are being made more freely.

CHICAGO.

OFFICE OF *The Iron Trade Review*.
1115 MONADNOCK BLOCK, April 12

As spring advances trade improves and the condition of the local market justifies the belief that the lowest levels in most products for this period of depression have been touched. Pig iron is firmer than it has been at any previous time this year, and producers appear in no fear of any relapse in prices. The $10 Birmingham schedule is being maintained by all Southern interests, and at least one furnace thinks the situation strong enough to warrant asking 25 cents a ton more, this being put into effect last week. Northern irons are also very firm and $14.25 Chicago is the minimum at which local No. 2 foundry can be bought in this market. Transactions have not been heavy since our last report, but the inquiry aggregated considerably over 15,000 tons, in lots ranging from 5,000 tons down to 500 tons. Little of this tonnage is expected to be placed, sellers regarding the bulk of the industry in the nature of "feelers," and it is mentioned merely as indicating the restive condition of buyers. In finished materials, the local situation is somewhat disappointing. Plates are extremely quiet, and with the exception of some bridge and tank business, there is nothing doing in this product. The specifications for structural steel aggregated about 2,000 tons, which were supplemented with new business amounting to 1,000 tons, these figures including practically all the transactions of any note during the week under review. The boiler tube business is in a bad way, and the published prices of the leading producer are shaded from 5 percent to 10 percent by independent manufacturers. Light rails are in poor demand and somewhat closer prices are being made, though in heavy sections specifications to the local mill are all that can be desired. Sheets are still in a ragged condition and the schedules of the American Sheet Steel & Tin Plate Co. and of the independent association are being shaded at least $2 a ton on both black and galvanized. New business in bar iron and steel is not heavy, and the quotation of 1.50c for iron which has been in force for several weeks has been shaded in some instances in the last few days. Scrap iron is unchanged, and apart from a good demand for heavy cast and low phosphorus scrap for open-hearth furnaces the local market is quiet. Gray iron foundries and rolling mills are purchasing little material, and were it not for the transactions between dealers, which help to maintain prices, there would undoubtedly be further weakening in several of the most popular grades. Connellsville coke continues scarce, and standard 72-hour foundry is firm at from $2.35 to $2.50 at the ovens.

Pig Iron.—Increased firmness marks the local pig iron market. Consumption increases with the advance of spring, and there are many who look for a steady betterment of conditions from now on. Iron is moving more freely than for some time past, and it is evident that stocks in melters' yards are low, judged by the heavy inquiry of the past week. One interest in the South has already advanced its quotations 25 cents a ton; now asking $10.25 Birmingham for No. 2 foundry, and a local producer is also seriously considering putting up its prices 25 cents a ton on foundry grades this week. There is an expectation among both Northern and Southern sellers that there will be an advance on all grades in the near future, and 25 cents per ton is the figure generally agreed upon. One leading Southern interest has withdrawn from the market entirely in the past week, feeling that the situation, from the standpoint of its own sales during March, which aggregated 100,000 tons, and also from the heavy volume of business transacted in April, justifies better prices than are now prevailing. Contracting during the week, however, was light, notwithstanding the fact that inquiries were numerous, including one lot of 5,000 tons, another of 3,500 tons, two of 2,000 tons each, and several 1,000 and 500-ton lots. Northern irons are firm at the prices given below, and while we continue to quote $14 as the minimum for No. 2, little of this grade can be bought at less than $14.25. Low grade irons are scarce and prices firm. Lake Superior charcoal has also taken on increased firmness in the last two weeks, and the low prices prior to that period are now considered history. We quote as follows:

Lake Superior Charcoal	$15 00 to 15 50
Northern Coke Foundry No. 1	14 25 to 14 50
Northern Coke Foundry No. 2	14 00 to 14 25
Northern Coke Foundry No. 3	13 50 to 14 00
Northern Scotch Foundry No. 1	14 50 to 14 75
Ohio Strong Softeners No. 1	15 30 to 15 80
Ohio Strong Softeners No. 2	14 80 to 15 30
Southern Coke Foundry No. 1	14 35
Southern Coke Foundry No. 2	13 85
Southern Coke Foundry No. 3	13 35
Southern Coke Foundry No. 4	12 85
Southern No. 1 Soft	14 35
Southern No. 2 Soft	13 85
Southern Gray Forge	12 60 to 12 85
Southern Mottled	12 35 to 12 60
Southern Silveries (4% to 6% Silicon)	14 85 to 15 35
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 30
Alabama and Georgia Car Wheel	18 85 to 19 00
Malleable Bessemer	14 00 to 14 50
Basic Iron	13 85 to 14 35

Billets.—Little interest is shown. Inquiries and transactions are limited to small lots, for which association prices are obtained. We quote Bessemer and open-hearth billets, 4 x 4 and larger, up to .25 carbon, $24; up to and including .60 carbon, $1 extra; over .60 carbon, $2 extra. Axle and forging billets, smaller than 4 x 4, $25 Chicago. Open-hearth billets from store, $1.30 per 100 lb.

Iron and Steel Bars.—New business in either of these products is not very large, though the specifications on contracts received by manufacturers continue to be gratifyingly heavy. Some weakness developed in bar iron in the past week, and the price of 1.50c has been shaded slightly in several instances. Steel bars, however, are firm, and there is talk in some quarters of another advance of $1 a ton in the near future. Hoops are quiet, the natural sequel of the heavy buying of a few weeks back. The price of this product still remains at 1.56½c base Chicago, and from the fact that there is only a difference of 5 cents between the base price of hoops and bars,

which makes the net price of some sizes of hoops less than bands of a heavier gauge, it is believed the base price of hoops will be advanced to a corresponding differential. We continue to quote on carload lots, mill shipments, Chicago delivery: Bar iron, 1.45c to 1.50c half extras; soft steel bars, 1.51½c half extras, with 5c to 10c per 100 pounds extra for less than a carload lot and with the rerular extras for less than a ton of a size; angles, less than 3 x 3, 1.56½c base, half extras; hoops, 1.56½ full extras. On lots from store, we quote iron, 1.65c; steel, 1.75c base; hoops, 2.10c rates.

Sheets.—Despite the fact that there is a good volume of business in the market each week in both black and galvanized sheets, prices remain in a very ragged condition. The quotations of the leading producer are being shaded at least $2 a ton, and some sellers say that a desirable order would bring out still lower figures. The wide variation in quotations applies equally to galvanized and to black sheets, though it is done largely on gauges lighter than and including Nos. 16 and 17. The selling price of sheets may be considered almost an open one inasmuch as no two sellers agree. We quote the official prices of the leading producer on carload lots, Chicago delivery, though the buyer may shade them from $1 to $2 a ton, according to the size of the order and his desire for prompt shipment. One pass, cold rolled, black sheets, Nos. 16 and 17, 2.16½c; Nos. 18 and 21, 2.21½c; Nos. 22 and 24, 2.26½c; Nos. 25 and 26, 2.31½c; No. 27, 2.36½c; No. 28, 2.46½c; No. 29, 2.76½c; No. 30, 2.86½c. Galvanized sheets, carload lots, mill shipment, Chicago delivery: Nos. 16 and 17, 2.56½c; No. 18 and 21, 2.71½c; Nos. 22 and 24, 2.86½c; Nos. 25 and 26, 3.06½c; No. 27, 3.26½c; No. 28, 3.46½c; No. 29, 3.86½c; No. 30, 4.26½c. On small lots from store, we quote black sheets as follows: Nos. 8 and 10, 2.15c to 2.20c; No. 12, 2.20c to 2.25c; No. 14, 2.30c to 2.35c; No. 16, 2.40c to 2.45c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.65c to 2.70c; No. 27, 2.75c to 2.80c; No. 28, 2.80c to 2.85c; No. 29, 2.95c to 3c; No. 30, 3.10c to 3.25c. Galvanized, 75 and 7½ percent.

Structural Material.—Trading has been quiet during the week under review, the specifications received by the principal producer not exceeding 2,000 tons. Contracts for a building to be erected in this city were let last week which call for 1,000 tons of shapes. The movement from store is fairly good in small lots. Prices are unchanged, and we quote carload lots, mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles, 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 2c; 18, 20 and 24-inch, 10c extra; tees, 2.05c rates.

Plates.—There was a slight improvement in the specifications from bridge builders and tank manufacturers, but aside from this the market is without interest. Boilermakers are quiet and asking for little material. We quote carload lots, mill shipments, Chicago delivery: Tank steel, ¼ inch and heavier, 1.76½c; flange steel, 1.86½c; marine, 1.96½c; universal mill plate, 1.76½c to 1.81½c; 3-16 inch tank, 1.86½c; Nos. 7 and 8, 1.91½c; No. 9, 2.01½c; No. 10, 1.91½c; No. 11, 1.96½c; No. 12, 2.01½c. From store, we quote tank steel, ¼ inch and heavier, 2c; 3-16, 2.15c; No. 8, 2.20c; No. 10, 2.25c; flange steel, 2.35c, all f. o. b. warehouse.

Rails and Track Supplies.—There is a good inquiry for heavy sections from electrical and interurban roads and some new business has been booked. Steam roads, however, are doing little in the way of new business, though sending in specifications on contracts quite freely. Light rails have fallen off to some extent and active competition has brought down prices. Track supplies are moving freely, buyers taking all that mills can deliver. Prices are unchanged, and we quote heavy rails, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $24 to $28, with regular differentials for intermediate sizes. The following quotations on track supplies, which are f. o. b. Joliet mill, may be shaded on large orders: Angle bars, 1.40c to 1.50c; spikes, first quality, 1.70c to 1.80c (out of store, 1.90c rates); track bolts, 3½ x ¾, with square nuts, 2.40c to 2.50c per 100 pounds; with hexagon nuts, 2.55c to 2.65c, with usual differentials for other sizes.

Merchant Steel.—Producers report that specifications are in good volume, and that there is some inquiry for material covering requirements up to next June. The market is without material change and prices are unchanged. We quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 2c; sleigh shoe, flat sizes, 1.56½; concave and convex, 1.76½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.76½c base; smooth finished tire, 1.71½c; plow steel, 2.30c and upward, according to quality; toe calk, 2.06½c base. Ordinary grades of crucible tool steel, 6½c to 8c; special tool steel, 12c and up. Cold rolled shafting, 52 perent from list in carload lots, and 47 percent discount in less than car lots.

Cast Iron Pipe.—The principal contract of the week was one of 3,000 tons let by the city of Cleveland. The aggregate tonnage of the week was good, made up largely of the daily run of small lots. Prices are firm, and we quote carload lots, Chicago delivery: 4-inch water pipe, $26; 6-inch to 12-inch, $25; larger sizes, $24; gas pipe, $1 a ton higher.

Merchant Pipe.—Producers report there is no diminution in the heavy volume of specifications that have been coming in all this year, and that their entire output goes into immediate consumption. Prices are without change, and we quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guar. Wrought Iron. Black. Percent.	Guar. Wrought Iron. Galv. Percent.
⅛ to ¾ inch	66.35	56.35	64.35	54.35
½ inch	69.35	59.35	67.35	57.35
¾ to 6 inches	73.35	63.35	71.35	61.35
7 to 12 inches	69.35	59.35	66.35	56.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—Business is quiet and there is considerable cutting of prices by independent manufacturers. One seller of many years' experience stated that not within his knowledge has the boiler tube business been so quiet as at the present time. We continue to quote mill shipments, Chicago delivery, as follows, though these prices may be bettered 5 percent to 10 percent.

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	43.35	40.35	53.35
1¾ to 2¼ inch	55.35	38.35	40.35
2½ inch	58.35	43.35	40.35
2¾ inch to 5 inch	64.35	50.35	Up to 4 inches.
6 to 12 inch	55.35	38.35	48.35

For car lots or less, direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	40	35	37.50
1¾ to 2¼ inch	50	32.50	35
2¾ to 5 inch	60	45	Up to 4 inches.
6 to 12 inch	50	32.50	45

Wire Products.—New business has fallen off somewhat, this being the usual dull season of producers. Specifications on old orders, however, are taking the entire output of manufacturers and some are falling behind on shipments. Prices are without change and we quote carload lots to jobbers, Chicago delivery, as follows: Wire nails, carload lots, $2.10; less than carload lots, $2.15; cut nails, carload lots, 1.86½c base; less than carload lots, 1.19½c; smooth wire, carloads, $2, and $2.05 for less than carload lots; galvanized smooth wire, $2.30 in carloads, and $2.35 in lesser amounts; painted barbed wire, $2.40 carloads, and $2.45 in less than carload lots; galvanized barbed wire, $2.70 carloads, and $2.75 less than carload lots. Staples, polished, carloads, $2.25; less than carload lots, $2.30; galvanized, $2.55 carloads and $2.60 less than carload lots. Bale ties, 82½ and 5 percent discount, f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or De Kalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—Shipments from Connellsville have improved in the past week and the local market is slightly easier. Prices are firm, $5, Chicago, being the lowest at which standard 72-hour foundry coke can be obtained in this city with most dealers asking $5.15, Chicago. Virginia and West Virginia grades are offered freely from $2 to $2.25 at the ovens, and Milwaukee Solvay, in limited quantities, is offered at $5.10, Chicago.

Old Material.—The principal demand for scrap comes from open-hearth furnaces, who are taking all that the market offers and paying good prices for it. Foundries and rolling mills are taking little material and the market continues weak. We

quote dealers' selling prices, gross tons, as follows:

Old iron rails	$16 50 to 17 00
Old steel rails (mixed lengths)	11 25 to 11 75
Old steel rails (long lengths)	13 00 to 13 50
Relaying rails	23 00 to 24 00
Old wheels	13 50 to 14 00
Heavy melting steel	11 25 to 11 75
Mixed country steel	9 50 to 10 00

The following are selling prices for net tons:

Low phosphorus scrap (.04 and under)	$13 00 to 14 00
No. 1 R. R. wrought	12 50 to 13 00
No. 2 R. R. wrought	11 50 to 12 00
Shafting	13 50 to 14 00
Dealers' forge No. 1	9 75 to 10 25
No. 1 cast	11 50 to 12 00
No. 1 busheling and wrought pipe	9 00 to 9 50
Heavy cast (300 pounds and over)	8 50 to 9 25
Agricultural malleable	9 00 to 9 50
Iron axles	16 50 to 17 00
Steel axles	15 00 to 16 00
No. 1 boilers, cut	8 50 to 9 00
Cast borings	4 75 to 5 25
Mixed borings, etc.	4 75 to 5 25
Wrought turnings	7 25 to 7 75
Machine shop turnings	7 25 to 7 75
Iron axle turnings	8 25 to 8 75
Steel axle turnings	8 25 to 8 75
Stove plate and light cast scrap	9 50 to 10 00
Old iron splice bars	12 00 to 13 50

The Republic Iron & Steel Co., Chicago, has moved its general offices from the Chicago Stock Exchange Building to the First National Bank building, where it occupies the entire fifteenth floor.

Theodore Geissmann & Co., 115 Dearborn street, Chicago, are direct mill representatives in that city and the west in the sale of bar iron and steel, black and galvanized sheets, hoops, wire products, shafting, rods, etc. The company is desirous of securing the agency of one or two additional specialties in the iron and steel or heavy hardware line, its facilities being of such scope that it can handle these without diminishing the selling efficiency of its organization.

The Ward-Dickey Steel Co., Indiana Harbor, Ind., manufacturer of planished open-hearth steel sheets, under the Dickey patents, started up its plant this week for the second time. Operations were discontinued before because of the flooding of the mill by the recent heavy rains.

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROBE BUILDING, April 12.

The market is quiet, but prices are firm and there are no indications of a return to the very unfavorable conditions of the winter months. Evidence accumulates to show that the agricultural communities are doing more than any others in contributing to the prosperity of the country. For wire, agricultural implements and, in fact, everything that goes to the farm, there is a strong demand, but railroads and the urban population are not buying as freely as they did a year ago.

Iron Ore.—The meeting of representatives of Lake Superior iron ore interests, which was to mave been held April 12, was postponed until April 19. The situation in regard to an agreement has not changed during the week, but it is believed that there will be no further delay and that the meeting in New York will definitely determine whether or not there will be an open market.

The readjustment of wages of vessel employes is proceeding slowly, but satisfactorily. The longshoremen have accepted a reduction of 7½ percent of last year's wages with the hours of labor the same. Ore shovelers will be paid one cent a ton less than last year. The Lake Carriers' Association has been strengthened within a few days by the Gilchrist fleet becoming a member. The association has notified the masters that it will not recognize their union, but will make contracts with the men as individauls, for the reason that the masters are the representatives of the vessel owners and must be free from union dictation. Many of the masters do not desire to maintain the union, but it is not yet known what action a majority will take. Vessel owners feel that the question of masters belonging to a union must be settled some day and that the present season will be a favorable time for reaching a decision. Some additional charters for coal, including one for the first cargo of the new steamer Wolvin, have been announced, but nothing has yet been done on ore. It is expected that the freight rate for ore at the beginning of navigation will be 75 cents from the head of Lake Superior, 10 cents lower than the rate at the closing of navigation last year.

Pig Iron.—Orders for foundry iron are not for large tonnage, but the total of small orders amounts to about as much as Northern furnaces can take care of up to July 1, and neither buyers nor sellers are anxious to contract for the third quarter. If business in the jobbing foundries were to improve so that the buying of more iron would become necessary, prices would undoubtedly advance, but at present there is no prospect of such improvement and very little change in price for the first half is expected. No. 2 foundry is strong at $13 to $13.25 in the Valley. Local furnaces are selling No. 2 at $13.50 at their plants. Very little Southern iron is now being sold in this district. The lowest quotations are on a basis of $10 for No. 2 Birmingham, or $13.85 Cleveland, and some furnaces are asking $10.25. Several of the principal Southern interests have very little iron to sell for delivery before Aug. 1. We quote as follows for Cleveland delivery save on Northern gray forge, which is at Valley furnace:

Bessemer	$14 25 to 14 35
No. 1 Strong Foundry	14 10 to 14 25
No. 2 Strong Foundry	13 85 to 14 10
No. 3 Foundry	13 40 to 13 75
No. 2 Southern	13 85 to 14 00
Gray Forge, Valley furnace	13 40 to 13 75
Gray Forge, Southern	13 50 to 13 60
Lake Superior charcoal	14 25 to 14 50

Finished Material.—Structural material is in better demand, but the change from the excessive dullness which long prevailed is not pronounced. Reports are current that the building of a number of lake vessels is being considered, but nothing definite has developed and the demand for plates has not improved. Bar iron at 1.35c Pittsburg, or 1.44½c Cleveland, is dull, while steel bars at 1.35c for Bessemer and 1.40c for open hearth Pittsburg are not in strong demand. Business in hoops and bands is good. It has been reported that the price of sheets will be advanced April 15 and it is known that certain concessions made by the principal producer to large buyers will terminate on that date, but some very low prices have been made within a few days by smaller producers and conditions do not seem to warrant an advance. Deliveries are not being made as promptly as they were a few weeks ago, especially by the small mills. Prices of the principal producer through jobbers are as follows: Mill sales of black sheets, No. 10, 1.75c; No. 11-12, 1.80c; No. 14, 1.85c; No. 16, 1.95c; No. 27, 2.20c; No. 28, 2.30c. Galvanized, 80, and 3 off. Out of stock prices are as follows: No. 10, 2.10; No. 12, 2.15c; No. 14, 2.20c; No. 16, 2.30c; No. 18-20, 2.40c; No. 24, 2.45c; No. 25-26, 2.50c; No. 27, 2.55c; No. 28, 2.65c; No. 30, 3.10c. Galvanized out of stock, 75, 10 and 5 off.

Old Material.—Demand is not so strong, but prices have not declined. We quote as follows for gross tons Cleveland:

Old iron rails	$19 50 to 20 00
Old steel rails (over 6 feet)	14 00 to 14 50
Old steel rails (6 feet and under)	13 50 to 14 00
Old car wheels	13 00 to 14 00
Steel boiler plates	10 00 to 11 00
Malleable iron (railroad)	12 50 to 13 00
Malleable iron (agricultural)	10 00 to 10 50
Heavy steel	14 00 to 14 50

We quote the following net tons:

No. 1 R. R. Wrought	$14 00 to 15 00
No. 1 busheling	11 50 to 12 00
No. 1 machine cast scrap	11 50 to 12 00
Iron axles	16 50 to 17 50
Axle turnings	9 00 to 10 00
Wrought turnings (free from cast)	8 25 to 8 50
Uncut wrought iron boilers	5 00 to 6 00
Grate bars	9 00 to 10 00
Pipes and flues (clean)	10 50 to 11 50
Tank iron	9 50 to 10 50
Hoop and band iron	5 00 to 6 00
Sheet iron	4 00 to 5 00
Wrought drillings	7 00 to 8 00
Stove Plate	9 50 to 10 50
Steel axles	14 00 to 15 00
Cast borings	5 50 to 6 00

CINCINNATI.

April 12.

The coke market continues quiet with no change in prices. Foundry cokes are available at from $2 to $2.25, Connellsville. Furnace coke is reported somewhat more active.

Pig Iron.—The market has remained quiet the past week with no important change in conditions. It may be said, however, that in spite of the quietness, there is an undertone of strength. This is apparent from the fact that all substantial talk of offerings of Southern iron below $10 Birmingham for No. 2 foundry is absent. The market is therefore practically on a flat $10 basis. One of the most important furnace interests of the South is out of the market, and has nothing to

offer prior to July 1. While not much new business is being booked, it is noticeable that melters of foundry iron are taking more tonnage on their contracts and calling for iron more freely than they were two or three weeks ago. Inquires for No. 4 foundry and gray forge are fairly good, but these grades are scarce. No. 3 foundry is in better supply relatively than other grades. The general run of orders is for small lots ranging from a carload up to 100 tons, with but few large transactions reported. One thousand tons of Bessemer was sold in the Pittsburg district, and an Ohio furnace reports booking a 3,000-ton Bessemer order, but the prices were not made public. Some Ohio malleable was sold at $13.25 furnace. In the Northern irons, the furnaces in the northern part of the State are reported to be up to $13 and $13.25 for No. 2 foundry as a basis, while in the Ironton district, $12.50 to $13 still prevails. Advices from the South indicate that at the present rate of production Southern furnaces are pretty well sold up, and it has been demonstrated that at present prices there is not much likelihood of increasing output in that quarter. It is also reported that Eastern markets are taking a good share of the Southern furnace production which is available. This is confirmed by advices that the usual supply of Virginia iron has not been going to the East for some time past; and as Birmingham is now underselling Virginia, there is a natural advantage to melters in the East in buying the Alabama product. Current prices f. o. b. Cincinnati are:

Southern Foundry No. 1	$13 25 to 13 50
Southern Foundry No. 2	12 75
Southern Foundry No. 3	12 25
Southern Foundry No. 4	12 00
Southern Foundry No. 1 soft	13 25
Southern Foundry No. 2 soft	12 75
Gray Forge	11 75
Northern Foundry No. 1	14 15 to 14 65
Northern Foundry No. 2	13 65 to 14 15
Northern Silvery (8% silicon)	16 15 to 16 65
Southern car wheel iron	16 75 to 17 00

Finished Material.—The demand continues fairly good and the market is unchanged. Plates continue about the slowest sale of any item on the list. The firmness in bars continues well established. Bar iron is quoted at 1.45c f. o. b. Steel bars are advanced to 1.48c base, half extras, with dealers quoting 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 to 75, 5 and 2½ percent off. We quote black sheets, No. 27, at 2.45c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.80c; No. 27, 2.70c; No. 16, 2.45c; No. 14, 2.35c; No. 12, 2.30c; No. 10, 2.25c. Tank plates are dull and sell out of store at 2c for ¼-inch and 2.10c for 3-16 inch. Beams and channels are quoted at 1.90c to 2c from stock and angles at 1.90c to 2c for base sizes.

Merchant Pipe.—No change in the situation is reported this week, and orders are rather moderate. Independent mills are reported to be seeking business, offering some inducements, but without important disturbance of prices. We quote car load lots f. o. b. Cincinnati:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	64.7	54.7
½ inch	69.7	59.7	67.7	57.7
¾ to 6 inch, inclusive	73.7	63.7	71.7	61.7
7 to 12 inch, inclusive	69.7	59.7	66.7	56.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	27.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—While it is reported that at other points railroads are offering scrap, there seems to be no disposition on the part of local railroad interests to ask for bids. It is believed that they are holding for higher price. Dealers in scrap are also firm in their views in spite of slow inquiry. Prices remain unchanged:

Old No. 1 railroad wrought, net tons	$11 50 to 12 00
Cast machine and foundry, net tons	11 00 to 11 50
Old iron rails, gross tons	16 00 to 16 50
Old steel rails, gross tons	12 50 to 13 00
Old short lengths, gross tons	11 00 to 12 00
Old iron axles, net tons	15 50 to 16 50
Stove plate, net tons	9 50 to 10 50
Wrought turnings, net tons	7 50 to 8 00
Cast borings, net tons	4 50 to 5 50

PHILADELPHIA.

April 12.

The improved conditions of the past four weeks continue. There are some indications of a decrease in demand in some lines, but there has been little change and none is expected during the first half of the year.

Pig Iron.—The market is rather quiet, but prices are maintained. The heavy buying has ceased, but as a large part of the output of the furnaces to July 1 has been sold, there is no anxiety among sellers. Few attempt to predict what the market will be during the summer months. Prices show little change. Southern iron is selling in small quantities at $10 Birmingham for No. 2. Buyers are very cautious. Basic is scarce for prompt shipment. We quote as follows: No. 1 X foundry, $15.75 to $16; No. 2 X foundry, $15 to $15.25; No. 2 plain, $14.25 to $14.75; gray forge, $13.25 to $13.75; Basic, $13.75 to $14; Southern No. 2 X, $14 to $14.25;

Steel.—The demand is strong and premiums are paid for prompt shipment. Nominal quotations are $25, but 50 cents more would be asked for April delivery.

Finished Material.—Bars are in good demand at 1.48½c to 1.53½c for either refined iron or soft steel. The mills are pretty busy, but have not many orders for delivery after June. Structural material has improved and plates also show slight improvement. Beams, angles and channels are selling at 1.73½c to 1.75c. Skelp is quoted at 1.55c to 1.65c for either iron or steel.

Old Material.—Prices are well maintained and the general tendency is upward. We quote: Old steel rails, $15 to $15.50; miscellaneous heavy steel, $14 to $15; low phosphorus scrap, $18 to $18.50; old steel axles, $18 to $19; old iron axles, $21.75 to $22.25; old iron rails, $18.50 to $19; old car wheels, $13.50 to $14; choice R. R. No. 1 wrought, $18 to $18.50; country scrap, $16 to $17; machinery cast, $13.50 to $14; No. 2 light scrap (forge), $12.50 to $13; No. 2 light scrap (ordinary), $10.50 to $11; axle turnings, $10.50 to $11; wrought turnings, $10 to $10.25; cast borings, $7.75 to $8.25; stove plate, $12.50 to $12.75; wrought iron pipe, $13 to $13.25; boiler punchings, $15.50 to $16.50.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., April 12.

The various meetings of steel billet, standard shape and plate manufacturers held in this city during the past week resulted as expected in the reaffirmation of prices. No statement regarding trade conditions in these materials was given out.

The recently published reports of the probable consolidation of the three leading Southern iron interests in the near future have no foundation. We have the highest authority for stating that there are obstacles which make the merger a distant probability at the best.

Pig Iron.—In the past week Northern furnacemen have taken the majority of the business, with the market a trifle less active than in the week previous. Talk of higher prices for both Northern and Southern brands is quite prevalent. The Northern situation seems to be particularly strong. Southern irons have been the subjects of so many conflicting reports that an exact estimate of their status is difficult. Early in the week it was said that leading interests were out of the market on all grades for the second quarter until further notice, but it is only the Sloss-Sheffield company of which this can be said. The other companies are in a position to take considerable business for delivery up to July 1. At present $10 Birmingham is said to be strictly adhered to, yet one company is reported to have offered to sell for less. There are reports of quotations at $10.25, but we hear of no sales at this figure. Press dispatches from Birmingham refer to the imminence of an advance in prices, but representatives of Southern furnaces here have received no intimation to that effect. Consumers are still wedded to buying for early requirements, and apparently have no thought of changing this policy. There is gossip that buying for the third quarter has started, but in well informed circles the report is discredited. The orders for the Pennsylvania castings have not yet been given out, but it is thought

they will be in a few days. New York prices on pig iron are as follows: Northern No. 1 X, $15.50 to $15.95; No. 2 X, $14.75 to $15.20; No. 2 plain, $14.50 to $14.95; Southern No. 1 foundry, $14 to $14.25; No. 2 foundry, $13.25 to $13.75; No 3 foundry, $12.75 to $13.25; No. 4 foundry, $12.25 to $12.75.

Rails.—There is nothing of interest to report. Small orders aggregating a goodly tonnage are coming in. Standard sections are $28 at mill.

Finished Iron and Steel.—The week has brought considerable activity in structural shapes. There were no contracts of importance closed, but small orders, ranging from 15 to 300 tons, and aggregating an excellent tonnage, were plentiful. Sales of this character by the American Bridge Co. were double those of any week for March. Contractors are speaking more hopefully of the outlook. The building strike situation in this city is improving, and some large propositions which have been lying dormant for some time show signs of animation. Plates are fairly active, although disappointment is expressed over the failure of prospective business to materialize. The mills, however, say they have enough orders on their books to keep them pretty busy during the next two months. The demand for sheets is fairly brisk. A fair business in bars is reported. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84½c to 1.90c; firebox, ordinary, 1.94½c to 2c; refined iron bars, 1.50c to 1.55c; soft steel bars, 1.50c to 1.55c; steel sheets, in carloads, New York, No. 28 black, 2.45c to 2.50c; galvanized 3.50c to 3.55c.

BIRMINGHAM, ALA.

April 12.

BIRMINGHAM, April 12.—Alabama iron market conditions at this time can be stated briefly: Furnace companies are pretty well sold ahead for the months of April, May and June; some companies out of the market altogether except to regular customers; quotations advancing and firm; No. 2 foundry quoted by furnaces sold well ahead, at $10.25 per ton. The Sloss-Sheffield Steel & Iron Co. officials announce that they are out of the market except to regular customers whom they are protecting at special prices. The Alabama Consolidated Coal & Iron Co. has been selling iron also quite liberally until today their books show large business on hand. Other companies in this section are quite well supplied with orders.

Inquiries are being received already for iron to be delivered during the third quarter of the year, though so far none of the manufacturers are willing to quote prices. As to production there is no hesitation or curtailment in the make in the Southern territory. The blowing in of an Ensley furnace by the Tennessee Coal, Iron & Railroad Co. ten days ago is followed this week by the blowing in of furnace No. 1 of the Republic Iron & Steel Co. at Thomas. The Republic company now has all three furnaces in this section in blast. The two furnaces going in blast this month will make an addition to the daily production of Alabama of about 450 tons.

Shipments are still heavy and in April promise to more than equal those of March. Railroad officials note a sharp demand on the part of manufacturers for cars with which to move the product promptly. The surplus iron in this section promises to be reduced to a considerable amount this quarter.

The Tennessee Coal, Iron & Railroad Co. has been able to keep in operation seven of the ten open-hearth furnaces at Ensley and the production of steel rails is quite satisfactory. As has been noted, there is objection on the part of labor in the open-hearth furnace department to the wages paid.

Cast iron pipe makers report activity in their industry. Shipments of cast iron pipe from this territory are heavy.

The rod, wire and nail mills of the Alabama Steel & Wire Co. at Ensley resumed operations this week, after being idle since last June. Employment will be given to more than 1,000 hands, the greater part common labor. There is a good demand for the products of the plant and shipments will be steady right from the start. The steel comes from Pennsylvania but the Gadsden steel plant will be ready by the last of May, it is expected. Mr. G. H. Schuler has removed from Gadsden to Birmingham.

The Gate City mills of the Republic Iron & Steel Co., and the Bessemer mills of the Tennessee Coal, Iron & Railroad Co. are still in operation. There is no immediate prospect of a resumption of work at the big Birmingham rolling mills belonging to the Republic company.

The plant of the Alabama Tube & Iron Co., located at Helena, Ala., 16 miles south of Birmingham, consisting of a small rolling mill and wrought iron pipe works, for the manufacture of three-quarters to two inch tubing, together with offices and houses for operatives, will be sold this month by the Birmingham Savings & Trust Co., trustee. Bids are now being received by the trustee, the sale to be private and made about the 30th inst. The plant has not been in operation for more than a year.

TRIBUTE TO JONATHAN WARNER.

The former business associates of Jonathan Warner, whose retirement as assistant to the first vice president of the American Sheet & Tin Plate Co., Pittsburg, was announced in our last issue, tendered him a banquet last week at the Duquesne Club, the occasion serving as an opportunity for the presentation of a beautiful loving cup and bowl. Mr. Warner has already gone to New York, which has been his

JONATHAN WARNER.

home for the past four years, and will shortly leave on an extended trip abroad. Whether his retirement from the sheet trade is permanent is by no means certain. His friends predict that he will be back in the industry again. After graduating at Williams College, Massachusetts, Mr. Warner associated himself with the Falcon Iron & Nail Co., at Niles, O., near which place he was born in 1867. In 1890 he purchased the old Struthers sheet steel works and lost no time in converting it into one of the most modern plants of its kind. The excellence of the products of the Struthers plant and the high standard maintained soon won a name for Mr. Warner and upon the formation of the American Steel Co. in 1899 not only was his plant taken over but Mr. Warner was made general manager. He then moved to New York having supervision of the Western territory including the roofing plants of the company. He personally assumed the duty of organizing the various works and raising the standards. When the Steel Corporation was formed Mr. Warner continued in the position of general manager of the American Sheet Steel Co., which place he filled until December, 1903, when he was elected assistant to W. M. Leeds, first vice president of the new American Sheet & Tin Plate Co. It is understood that S. A. Davis, now general manager of the Kiskiminetas plants, will succeed Mr. Warner.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., April 12.

Pig Tin.—The market has receded considerably from the strong position noted a week ago. A lessening in demand, and heavy arrivals have resulted in the disappearance of premiums on spot, which is quoted at this writing on a parity with futures, both here and abroad. For the time being consumers are allowing the market to take its course, and are simply buying material as they need it. The London market for the week was very feverish, and heavy declines resulted. Closing prices at the Metal Exchange today follow: Spot, April and May, 27¾c to 28⅛c. London's closings today for spot and futures were £127. Arrivals at Atlantic ports for the month to date amount to 2,850 tons, with 1,294 tons afloat.

Copper.—Although the "official" prices were again advanced ⅛ cent during the week, because of the heavy exports, the genuineness of the latter are being seriously questioned by consumers, who now think that they are not finding their way into deliveries. This, together with the belief that the export movement is likely to show a considerable falling off during the next few weeks, has made buyers extremely cautious, and as a result nearly all of the orders being placed now are those which cannot be deferred. Believers in lower prices are numerous. London was slightly lower during the week, and with a weaker undertone. Today's closings at the Metal Exchange follow: Lake, 13⅛ to 13⅜c; electrolytic, 13⅛ to 13¼c; casting, 12⅞ to 13⅛c. London closed today with £58 10s for spot, and £58 2s 6d for futures. Exports for the month to date aggregate 4,197 tons, against 1,790 for the same time last year.

Lead.—Is firm and unchanged at 4.60c to 4.65c. St. Louis is weaker at 4.42½c. London is slightly higher at £12 7s 6d.

Spelter.—Is firm at 5.25 to 5.30c. St. Louis and London are stronger at 5.05c and £22 5s respectively.

Antimony.—Prices are unchanged, Cookson's being 7¾c to 8c; Hallett's, 7¼c to 7½c, and other grades, 6¼c to 6½c.

Quicksilver.—We quote $46 per flask of 76½ pounds in lots of 100 flasks. London is £8 5s.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, April 12.

The metal market remains firm though buying is of desultory proportions. Copper is strong at 13c for Lake and 13¼c for casting, carload lots. Spelter and sheet zinc are firm, the former selling at 5⅛c for carloads, and 5¼c to 5½c for lesser lots, and sheet zinc, at 5.75 per lb. in car lots of 600-lb. casks, and 5.95c to 6c for less than carload lots. Pig lead is quoted 4.45c in carload lots, and 4.50c to 4.55c in lesser amounts. Pig tin, 29¾c for car lots, and 30¼c for less than carload lots. Antimony, 8½c to 8⅝c for Cookson's, and 7¼c to 7½c for Hallett's. Nickel, 45c to 60c, according to amount and deliveries. Old metals are in good demand and of an advancing tendency, the following quotations ruling: Copper wire and heavy, 11⅛c; copper bottoms, 10c; copper clips, 11c; red brass, 10c; yellow brass (heavy), 7¾c; yellow brass borings, 6c; red brass borings, 8c; light brass, 5½c; pipe lead, 4c; tea lead, 3.90c.

The South Side Elevated Railroad Co., Chicago, at a meeting of its stockholders, Thursday, April 8, voted to increase the capital stock of the company $7,226,000, as recommended by the board of directors, the proceeds of the new issue to be used in payment of the cost of the proposed extensions to Englewood and the stockyards and also for the installation of a third track for the express service between Twelfth and Forty-third streets. This company operates an elevated railroad, popularly known as the "Alley L," between Congress street and Stony Island avenue, a distance of about 15 miles, which was completed in 1892.

REDUCING A HIGH BLAST FURNACE.

At Youngstown, O., the Carnegie Steel Co. is performing a novel engineering feat in reducing the height of stack No. 3 of the Ohio plant at that place. The stack was originally 106½ feet high, but it is evident that the day of furnaces over 100 feet in height is past and furnace operators are again preferring to operate with furnaces from 85 to 90 feet in height. When the work of reducing this stack is completed the furnace will be 90 feet high, 16½ feet being cut out at the opening in the shell shown in the illustration. For several months this work has been going on, and the work of lowering the top is shortly to be commenced. The work was undertaken with the idea of not disturbing any of the furnace top mechanism, and in order to support this tremendous weight while the height of the stack was being reduced supports of logs were built up inside the stack. The work of removing the plates in the shell was then commenced and has progressed to the point shown in the illustration. Additional plates will have to be removed in order to give the proper slope to the stack and in order that the top when lowered will rest properly and its extending shell will fit exactly the shell of the lower part of the stack. It was found

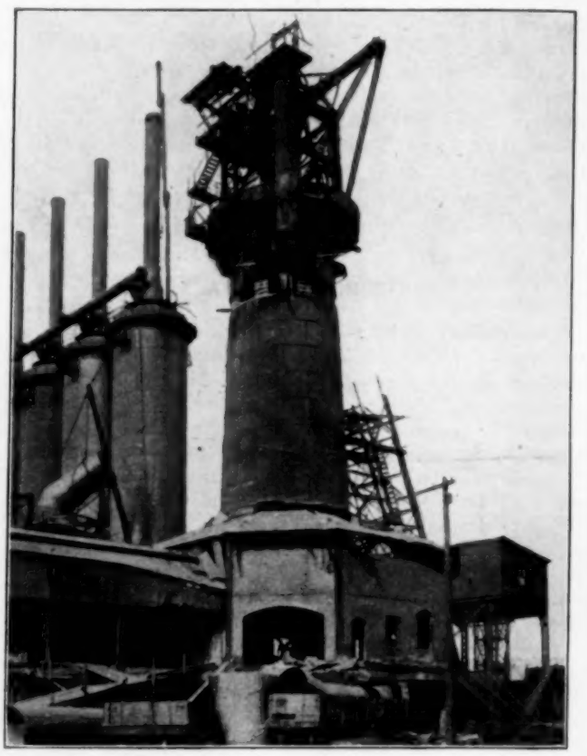


FIG. 1.—REDUCING FURNACE NO. 3 OF THE OHIO PLANT OF THE CARNEGIE STEEL CO. FROM 106½ FEET TO 90 FEET.
(Photograph by courtesy of the Pittsburg *Commercial Gazette*.)

necessary to remove a portion of the skip hoist incline, but more than half still remains supported. That the Carnegie Steel Co. appreciates the economy of lower stacks is indicated by the height of furnace No. 4 now under construction, which will be 90 feet. The work of reducing No. 3 will be completed in about two months.

O. S. Kelly, who was for many years associated with Wm. N. Whiteley in the manufacture of reapers at Springfield, O., died in that city, April 11, aged 78. He was left an orphan at an early age and for several years worked as a carpenter. In 1852 he sought his fortune in California. He brought home a sum of money which was used in the formation of the partnership of William N. Whiteley, O. S. Kelly and Jerome Fassler, who at one time in the making of harvesters had 3,000 men on their payroll. He sold his interest in the Whiteley company early in the 80's. He built the Arcade hotel, bought out Rinehart, Ballard & Co., established the Springfield Engine & Thrasher Co., and later the Kelly Road Roller Co. and the Kelly Piano Plate Co.

METHOD OF WELDING WITH THERMIT.

Thermit gives off at a temperature of about 5,400 degrees Fahrenheit a liquid iron of great purity and of a tenacity equal to mild steel. The thermit steel has the property of melting the cold surface of the metal it touches and uniting with it to form one solid mass. The reaction takes place in a crucible which has at its bottom a hard, burnt magnesia stone. The thermit powder is poured into the crucible to show a level surface on the top. In the middle of this space is placed a pinch of ignition powder which is ignited by applying a storm or Bengal match immediately after it has been struck. By this means the chemical reaction is started at once and is complete in less than half a minute, whatever the size of the crucible. The result is a pure liquid steel which sinks to the bottom of the crucible and is covered by a perfectly distinct layer of aluminum slag. The liquid steel and slag are run into a mold by tapping the crucible from the bottom. The mold is so constructed as to automatically separate the steel from the much lighter slag. This is the ordinary method of welding, but Dr. Goldschmidt has just sent from Essen to the Goldschmidt Thermit Co., Wall Street Exchange building, New York, particulars of a new application of thermit welding in connection with long cracks or seams. This later process is peculiar in the fact that a part of the thermit reaction takes place in the mold itself. Ordinarily if slag was produced in the mold, it would by covering the welding surface with a thin but perfectly refractory layer prevent the fusion of the liquid thermit steel with the object of the operation.

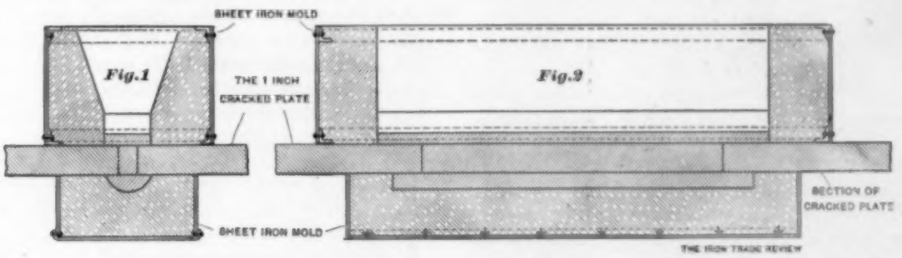
The new process requires the liquid thermit steel to be first prepared in a so-called "special" crucible made with a flat-bottom, and it is then poured into the mold and between the welding surfaces of the fracture. Then the thermit powder is poured in and this ignites on coming in contact with the superheated steel. The intense reaction which ensues will communicate its temperature to the surfaces and the "welding" steel and thereby adding to the heat of the zone will effect a perfect fusion of the parts. The cracks must have previously been opened out from ½ to ¾ inches, according to the thickness of the metal, and thoroughly cleaned from rust, etc.

The mold is trough shaped and made out of an ⅛-inch thick sheet iron. It is filled with a tamped down mixture of equal parts of rich loam and good quartz sand or a mixture of powdered fireclay with 20 to 30 percent of loam. The inner space of the mold must allow for 3 to 4 inches greater length and about one inch greater width than the crack. The depth of the welded on metal must also be about one inch, and the total clear height of the mold must be from 4 to 6 inches. The lower part of the work must be closed up by a similar mold of trough shape in order to allow the thermit steel to overlap the welding edges by from ½ to ¾ inch. The amount of thermit necessary to fill the mold is readily calculated when it is remembered that one pound of thermit gives ½ pound of steel.

The illustration exhibits the apparatus necessary for the process of preparing a long crack in a plate. Fig. 1 is a transverse section across the crack and the upper and lower molds; Fig. 2 is a longitudinal section at right angles to the other illustration. Dr. Goldschmidt submits the following instructions for the repair of the fracture: Warm the piece at the crack and then place the lower mold in position and follow this with the location of the upper mold. Carefully lute all the edges between the molds and the work. The mold is surrounded with slightly moistened sand which is carefully banked up in place. The amount of thermit is now measured off to run a ½-inch bar of steel on to the welding surface, and this quantity is ignited in a flat bottomed "special" crucible. As soon as the reaction is complete the slag is poured off into dry sand and any particles are removed with a cold iron rod from the sparkling liquid steel. Dark spectacles are an indispensable precaution for the workman. Then the liquid steel is poured rapidly into the mold in such a manner as to distribute it as evenly as possible over the whole welding zone. The thermit to be added has been previously weighed and held in readiness for application as soon as the crucible is emptied and will ignite at once in coming in contact with the thermit steel. When the piece has been cooled the mold is removed and as much as seems advisable of the steel is cut off with a chisel. Experienced workmen can remove the mold some minutes after the reaction and the superfluous steel may be removed easily but deftly with a scraper whilst it is still hot.

As an example, suppose a crack 11 inches long is to be welded in a wrought iron plate. The crack is first opened out to ½ inch. The lower mold has a channel 2 inches wide and ½ inch deep; the upper mold has a width of 2 inches at the base and the depth of added metal will be 1¼ inches. As already indicated, only ½ inch of this is to come out of the welding steel, the remaining ¾ inch being supplied by the thermit ignited in the mold.

The calculation of the necessary amount of thermit is as follows for the contents of the crucible: The channel in the lower mold = 2 x ½ inch = 1 sq. inch; the capacity of the crack in the plate = 1 inch x ½ inch = ½ sq. inch; the channel in the upper mold = 2 inches x ½ inch = 1 sq. inch. The length of crack 11 inches and the length of mold 15 inches require: 2½ x 15 x 4½ = 169 ounces or 10½ pounds of thermit steel. The reaction in the special crucible requires, therefore, about 21 pounds of thermit. The quantity of thermit poured into the mold for ignition there is figured similarly: 2 x ¾ x 15 x 4½ = 101 ounces; or 202 ounces equals 12½ pounds of thermit. The multiplier 4½ is the number of ounces to the cubic inch of thermit steel. The weight of thermit steel is multiplied by 2 in order to arrive at the weight of the thermit itself.



THE THERMIT WELDING OF PLATES.

The piece to be welded must, of course, lie as nearly horizontal as possible in order that the layer of thermit steel may be made of even thickness throughout. The principle of the operation is exactly the same in the case of repairing wrought iron plates which are attacked by rust, etc. Where the metal is not too thin and the crack does not go through the plate, the lower mold can be dispensed with as long as moistened sand is banked up against the exterior. Cast iron plates often lend themselves very well to this repair. In such cases one percent silicon in the form of a 14 percent ferro-silicon may usefully be added to the thermit. This will prevent hard spots where the thermit steel and the cast iron meet.

The Yale & Towne Mfg. Co., Stamford, Conn., has made preparation to install a very extensive exhibit at the Louisiana Purchase Exposition, showing chain blocks, overhead carrier systems and labor saving appliances in actual use, demonstrating the vast economies represented by up-to-date hoisting and transferring methods as compared to old methods. The exhibit will contain some entirely new features in the way of improved hoisting equipment and will be of especial benefit to engineers interested in handling and transferring of material.

MITCHELL VALVE RESEATING MACHINE.

The Mitchell & Mitchell universal valve reseating machine is a recently perfected tool for renewing the seat surfaces of steam pumps, globe valves, etc. The machine comprises a cutter holder or chuck at the end of a stem which can be readily applied in suitable position for accurately facing the valve seats. The cutters are plain straight lengths of tool steel carefully hardened and fitting a recess in the cutter holder. The recess is made with ample bearing for the support and grip of the length of tool steel serving as a cutter. It will be seen that the cutter is in contact with the holder only on the back and edges and therefore the cutting teeth may extend along the entire area of the tool and the workman may thus take a chip close to the center of the circle covered by the tool. This is a point of some importance in light work where the opening through the seat is of very small diameter. The cutter has a series of grooves cut parallel to each other and about an angle of 60 degrees to the sides of the blade. These are spaced ten to the inch through other intervals between the teeth have been employed with satisfactory results for special purposes. These are made at present for cutting all flat seat globe valves from ¼-inch up to 4 inches diameter and all flat or web seats of steam pumps from ¼-inch up to 5¼ inches. The cutters, as has already been intimated, are of uniform width and will fit three styles of tool holder.

FIG. 1.—RESEATING 2-INCH GLOBE VALVE.

The different styles of holder and stem have plain or threaded stems with bushings to act as guides in the larger valves. The neck of the valve can in the smaller sizes be employed as the guide, as is illustrated in Fig. 1, where the necessary power is applied through a brace in reseating a 2-inch globe valve seat. The stems are made in a variety of forms and lengths to admit of use through side openings or hand holes on lower seats of a pump or for similar purposes. An eccentric bushing is provided for the purpose of adjusting the cutting tool to any possible variation there may be between the surface to which the supporting arm is attached and the valve seat itself. When the mark on the arm and another in the bushing are in agreement the cutting tool will be set true with the face and bore of the arm, but by rotation of the bushing in the arm the cutting tool may be varied from this position up to a taper of 1-16 to the inch. When the tools are in the desired position to operate accurately on the seat the sleeve is set down on the spring with the tension adjuster turned up to the top of thread and the grip in arm is tightened to hold the sleeve rigid. The lowering of the tension adjuster can now be made until the required pressure on the tool is obtained, the grip secured and the machine is in position for operation.

A grip collar is used for limiting the drop of the cutter when starting on an uneven surface and may also be employed in reducing the cut when finishing up work to ensure a perfect face. The collar is illustrated in Figs. 2 and 3. Fig. 2 shows the Mitchell machine ready for work on the slide valve throttle of a steam steerer. This work is done by the use of a tool which will turn between the walls or housing of the chamber and thus cutting away in a circle the amount equal to the smallest dimension of the steam chest. The cutter is then removed and shorter cutters employed, the machine set over in each corner and the face cut down to the depth left by the first operation. It was a task of this type that led up to the development of the tool, and the simple rig suggested for the work will materially cut down the time of nibbling away with hand operated chisel and file in such limited quarters. Fig. 3 shows the reseater as applied to the valve disc faces of a Laidlaw-Dunn-Gordon 8 x 4 x 10-inch plunger steam pump. The bonnet has been removed and the cutter stem has a double bearing to secure greater rigidity with the device. For shorter distances the single arm will probably be quite sufficient. The valve seats illustrated in Fig. 3 are of the web type and 3½ inches diameter. This reseating tool is made by J. D. Mitchell, Perry-Payne building, Cleveland, agent for the Mitchell brothers, the patentees.

A Bronze Testing up to 80,000 Pounds.

A correspondent of *Machinery* states that the foundry at the shops of the Rock Island Arsenal make a bronze that must test 60,000 pounds per square inch and they have had it run as high as 80,000 pounds per square inch. This is the bronze used on the 3-inch gun carriage, model 1902, that is built at this arsenal. The treatment of this bronze as to purity, temperature of heating, method of mixing is as given by Herbert E. Field in a recent article on "Alloys of High Tensile Strength." The composition differs, though, from Mr. Field's; it is simply 66 2-3 percent copper, 33 1-3 percent zinc, and a touch of aluminum. No tin and positively no scrap for this bronze, which they call their No. 1. The elongation of this metal is 20 percent.

The Youngstown Manufacturers' Association, of Youngstown, O., has elected officers for the ensuing year as follows: M. A. Neeland, president; G. A. Doeright, vice president; Harry A. Boyd, secretary and treasurer; C. H. Booth, W. J. Wallis and C. R. Darrow, executive committee.

Pickands, Mather & Co., Cleveland, have sent out their iron ore analysis book for the coming season. It gives exhaustive analyses of their ores, covering shipments in 1903, in some cases the expected analysis for 1904, together with the guarantees in iron and phosphorus for the season of 1904. The same firm is sending to its trade a series of valuable charts, one

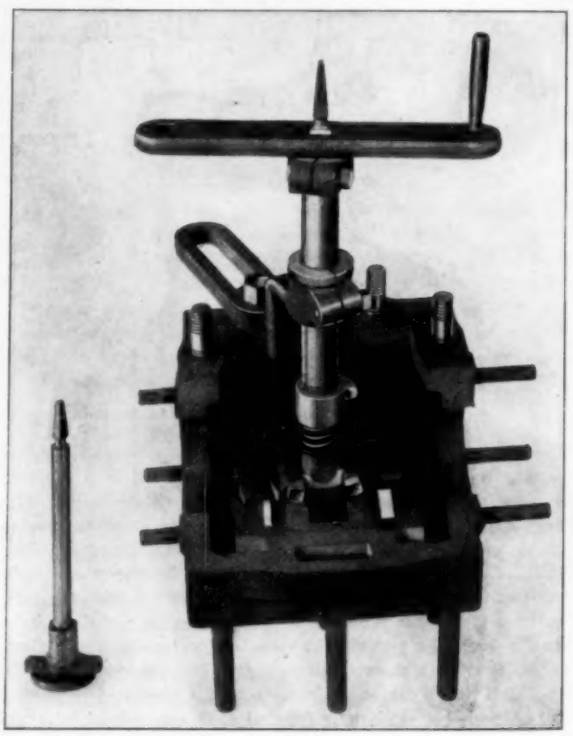


FIG. 2.—MITCHELL MACHINE RESEATING THROTTLE SEAT OF STEAM STEERER.

showing graphically iron ore production over a series of years in the United States and in the Lake Superior region, a second platting the coal production in the United States and a third pig iron production in the United States by years from 1854 down and at 10-year intervals from 1810 to 1850. Each chart gives also the comparative production in other countries in the last year for which there are official statistics.

Fire Insurance Engineering.

A course in insurance is one of the new things at Yale University and we are permitted to make some extracts from a copyrighted lecture in the *Alumni Weekly* on "Fire Insurance Engineering." The address by H. C. Henley, of St. Louis, will be found of especial interest after recent fire experiences in Baltimore. The speaker asserted that much of the enormous fire loss is due to faulty building construction, open elevator shafts, stairways, light shafts, well holes and other communicating openings through floors creating natural flues. He described the standard slow-burning building and said it differed from the structure of joist construction in the following particulars: The elevators, stairs, belts, etc., are enclosed in brick shafts; walls of shaft extending three feet above roof and shaft communicating with each floor through openings provided with standard automatic fire doors. Floors are solid, without openings, constructed of heavy tongued and grooved plank with top floor of matched boards, with two thicknesses of asbestos paper between the two. The floors are laid directly upon the beams and girders and the bottom of the beams and girders are left open, preventing any concealed spaces in which dirt can accumulate. In this construction, there is less surface exposed to flame, and the beams being heavier than joist in joist construction, the floor is kept intact a longer period of time, and there is a chance to hold fires that occur, upon the floor in which they originate.

Walls should preferably be built of hard-burned brick laid in cement mortar. Stone disintegrates quickly and granite is particularly bad under heat and will not stand fire and water. Steel or iron framework of walls, unless protected by brick or terra cotta, loses its strength rapidly under heat.

The strength of the wall depends upon the mortar used and the best mortar is composed of Portland cement and clean, sharp sand, mixed while dry in the proportion of not less than one of cement to three of sand, thoroughly mixed to a uniform color and sufficient water added to make a smooth mortar. The mortar should not be allowed to set or become hard before used. Mortar made and used as stated above will bond well and is very adhesive. Poor mortar is as bad as poor bricks and a wall made with poor mortar will be merely a pile of bricks with no bond after a few months' weathering. Brick should be thoroughly wet before being laid, preventing the absorption of the moisture from the mortar and causing it to cling to the brick. The thickness of walls should not be less than the following: The top story 13 inches; the next two below 18 inches; the next two below 22 inches; the next two below 18 inches; the next two below 22 inches; the next two below 26 inches; the next two below 30 inches.

To prevent the weakening of the walls by insertion of the ends of beams they should be corbeled out on each floor to form a 4-inch ledge for the floor planks to rest upon, unless a 4-inch ledge is made by the walls receding to smaller dimensions. Changes in the thickness of walls should be made on a line with top floor beams. No wood planking, wood plates or wood lintels should be built in walls.

In some instances, builders prefer to build wood plates in walls extending the full length at each floor level, for the purpose of supporting the floors. The wood plates enable them to lay the floor quickly and the floor requires no leveling. Introduction of these wood plates in the wall weakens it by reducing the thickness at that point and the shrinkage of the wood plates renders the floor at that point leaky.

Division Walls, Beams and Girders.

As division walls, in the event of fire, are apt to be subjected to severe heat and shock from falling portions of buildings which they separate, it is necessary that they be built heavier and stronger than called for in exterior wall construction, and all party or division walls and bearing walls over 100 feet in length should be 4 inches thicker than the thickness called for in exterior walls, and the walls should be carried three feet above the roof and be coped with stone, cast iron or tile and corbeled to extend past the cornice line.

Flues for boilers, furnaces, etc., which heat the flue to a high temperature should be provided with double walls of a combined thickness of 13 inches, leaving an air space of 2 inches in thickness for a distance of at least 25 feet above the smoke inlet. This inner wall should be constructed of fire brick, laid in fire clay mortar. All woodwork should be trimmed away at least 2 inches from outside wall of flue and the space thus formed between trimmers and wall left open for ventilation, and no beam, girders or other woodwork should enter a wall within 12 inches of the interior of any flue.

In buildings of this type it is preferable that all columns, beams and girders be of solid timber. Unprotected iron and steel supports are very unreliable and will bend and twist quickly under heat. No metal supports should be used unless properly fireproofed. Stone or granite must not be used for any of the interior supports. The columns, beams and girders should be of such dimensions as to easily bear their respective strains after allowing an inch for charring on all sides. They should be planed smooth on all sides which may be exposed to action of fire. Special precaution should be taken to secure ventilation around ends of timbers where entering walls, to prevent dry rot. Beams and girders should rest upon cast iron wall boxes built in the wall. All beams and girders should be leveled at top, properly anchored to wall, but in such a manner as to be self-releasing, so that in the event of a serious fire, their falling will not pry down the wall. The

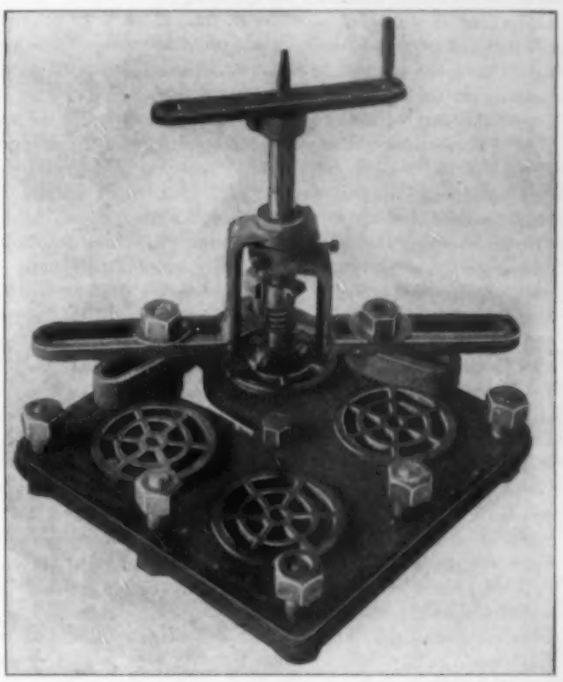


FIG. 3.—RESEATING TOOL ON STEAM PUMP DISC.

most simple arrangement is notching the under side of beams near the end and fitting the notch over a lug arranged upon the wall box. Columns should be continuous throughout all stories and ends connected with cast iron caps, lintels and base plates and also to be arranged in such a manner as to be self-releasing. Where iron columns, girders and beams are used they should be protected by fireproof covering of Portland cement concrete, not less than 2½ inches thick at any point. A compromise construction, consisting of built-up timbers of small dimensions, bolted together with washers placed between the timbers, the idea to prevent dry rot occuring in the timber, has not proven satisfactory, as there is more surface exposed to the flames, and fire in these crevices cannot be reached by streams.

Floors, Roofs, Stairways.

The construction of floors is one of the most important features of the slow-burning building, and, if properly built, the floors will retard fire for a considerable length of time. They should be without any openings, and as the ceilings are open and smooth, effective service from hose streams may be obtained, provided the building is not of excessive area and height. Floors should be double; the under floor of plank,

the upper floor of hardwood at least seven-eighths of an inch thick, tongued and grooved. Floors should be laid directly upon the beams or girders. The under or heavy floor plank should be planed on the exposed surface, splined or tongued and grooved, and at least 2¾ inches thick. For bays exceeding 8 feet, the thickness of the plank should be increased. Between two floors two thicknesses of asbestos paper should be laid, care being taken to break joints, and paper should be turned up at least 3 inches at walls and secured in place by 2-inch molding, nailed to floor. Roofing paper is of little service in floors, as it becomes torn through the shrinkage of the planks. It is neither water-tight, nor does it act as a fire retardent. The floors may be arranged to drain, by sloping them toward scuppers arranged in walls. The scupper should be placed about 2 inches below the level of the floor. Openings in the floors for steam and all other pipes, to prevent water from passing through openings made for pipe, should be provided with wrought or cast iron thimbles made water-tight at the floor, and extending 3 inches above it. No openings should be made through floors for elevator ropes or belts, but they should be enclosed within the brick walls of elevator shaft. Woodwork should not be painted or varnished. Fireproof paint for the under side of the floors may be used, but it is preferable not to paint the heavy woodwork until it has been up for some time and becomes dry.

The roof should be of plank and beam; plank to be tongued and grooved or splined and not less than 2¾ inches thick and planed upon the under side and covered externally with metal, composition or tile. A very acceptable roof is constructed of two thicknesses of asbestos paper laid directly upon the top of roof planks; one thickness of roofing felt upon the asbestos paper and the roofing felt covered with tar and gravel. A roof constructed in this manner will hold a fire within the building until the upper part of the building is nearly destroyed, lessening the chances of ignition of exposed buildings.

Stairways and elevators should be enclosed with walls of brick or Portland cement concrete and where used as bearing walls they should be of standard thickness for their height; non-bearing walls may be 4 inches less in thickness, but no wall should be less than 13 inches. Portland cement concrete walls, when reinforced with steel, or iron columns and beams, of sufficient strength to carry floors and their loads, should be not less than 12 inches thick. All steel and iron should be protected with, at least, 2½ inches of concrete. Walls should extent, at least, 3 feet above the roof. All doors opening into the shaft should be protected by standard, automatic metal clad fire doors. Rolling steel shutters have been used to some extent for the protection of these openings, but this class of shutter is not reliable, cannot be closed quickly and is difficult to repair, and is not to be recommended. Doorways into shaft should have iron or concrete sills, and the sills should be sufficient in width to cover bottom of door and full thickness of wall. The bottom of stair shafts is used at times for general storage, and if the stairs in shafts are constructed of wood, a fire at the base of the shaft would extend to the top, and possibly communicate with the various floors of building. The elevator shaft should extend 3 feet below basement floor level, and should be provided with adequate drainage connected with the sewer. The elevator shaft should not be obstructed at the top by solid floors or platforms for the support of elevator motors or machinery; if extending over shaft, floor should be of open lattice work, permitting the free discharge of smoke through skylight in case of fire. All openings into shaft should be protected with automatic fire doors.

Openings in exterior walls should be as few and small as possible and be protected with standard coverings. The openings for windows on street side should not exceed 60 percent of the wall area and the openings for windows on sides exposed should not exceed 30 percent of the wall area. Windows and door sills should be stone, iron or other incombustible material and the sills should be of an equal thickness of the wall and project sufficiently to cover bottom of fire shutters. This is of importance as in many cases shutters do not fit sufficiently close to the walls to exclude flame from an exposing building. The exposure of openings overlooking roofs of adjoining buildings is very severe and these openings should be protected in a substantial manner with standard metal clad fire shutters, fitting closely to wall, or by standard metal frames and sash with wire glass. Sheet metal shutters warp easily under heat, convey fire to interior or building through radiation and have not given satisfaction.

Openings through party or division walls into adjoining building should be provided with double, metal clad, automatic fire doors, and all shaft and belt holes should be made as small as possible by being bricked up or by being provided with double, metal clad fire shutters or metal hoods.

Boilers should be located in fireproof compartments, walls constructed of brick of at least 13 inches in thickness. Ceiling should be constructed of cinder concrete, tile, or be of brick arch construction. All openings into buildings should be protected with standard automatic fire doors. A 9-inch brick wall is of insufficient strength to permanently support the weight of fire doors. Breeching of boiler should connect to a brick stack, and not to metal smoke stack, arranged outside of external wall.

In large cities having first-class fire departments, buildings should not exceed five stories in height. Unless the building is protected with automatic sprinklers, the area of the building should not exceed 5,000 square feet. Buildings of larger area should be subdivided by division walls, communicating through openings provided with automatic fire doors. Buildings of very large area filled with combustible stocks, stock at times piled to ceilings and in a manner impossible to introduce streams to center of floors, are not safe when of any known construction.

"Fireproof" Construction.

The speaker said in regard to "fireproof" construction, that buildings of this type differ from the slow-burning building in the construction of the floors and roofs; the floors and roof being constructed wholly of non-combustible material such as cinder concrete, tile or brick, supported by protected steel work. In the skeleton type of fireproof construction the entire load is carried by a framing of steel, all exterior columns being protected by fireproofing of sufficient thickness to protect the steel work. Vertical openings through floors of buildings of this type are just as objectionable as in buildings of slow-burning construction, and all elevators, stairs, etc., should be enclosed with brick shafts with openings communicating with each floor protected by automatic fire doors.

The best fire door is the wood, tin-clad door, hung upon a rail which is fastened to the wall on an incline and so arranged with fusible link that upon the melting of the fuse the door will automatically close. This automatic arrangement should not be such as to prevent the doors from being closed by hand when the openings are not in use, and the doors should be operated daily. Wood tin-clad doors not exceeding 48 square feet should be made of two thicknesses of well-seasoned white pine of at least seven-eighths inch thickness each. One layer to be vertical, and the other layer to be at right angles; layers securely fastened together by wrought iron clinch nails. The doors should be thoroughly covered upon all sides and edges with heavy tin plates not exceeding 14 x 20 inches in side, and all joints locked and nailed under seams. The door should be of sufficient area to cover the opening, which it is intended to protect, 2 inches upon all sides and top. Doors exceeding 48 square feet of area should be constructed of three thicknesses of seven-eighths-inch white pine placed together and covered as described above. The value of the door will depend upon the quality of the tin and the manner in which the joints have been made, as the covering must be sufficiently tight to exclude oxygen, preventing combustion of the woodwork. Hardware for fire doors should be of wrought iron, as cast iron fractures upon application of water when heated. Fire doors constructed wholly of iron or steel warp under heat, carry fire through the openings they are intended to protect by radiation, and are not easily repaired, and have given very poor satisfaction.

Electric lights afford the safest and most convenient means of furnishing light and power at the present time, when the wiring is properly installed and maintained in good condition. Where the circuits are supported upon the ceilings they should follow the contour of the beams and be fastened by sufficient porcelain cleats to securely hold them in place. Wires sup-

ported from beam to beam, sag and loosen at supports, and within a short time hang in loops and easily become crossed. Insecure fastenings, loose connections in joints, switches and cutouts are responsible for most of the fires caused by electricity. The wires, switches and cutouts should be of ample capacity. The switches and cutouts constructed of non-combustible material; all connections well and securely made and circuits protected by proper sized fuses. All fuse metal should be enclosed to prevent the ignition of combustible material nearby from the blowing of the fuse.

Automatic Sprinkler Service.

An automatic sprinkler equipment consists of an arrangement of pipes regularly spaced under all ceilings and extending to all closets, rooms, under benches and all concealed spaces with automatic sprinkler heads or valves attached; the system of piping being supplied automatically with water from elevated tanks, pressure tanks, city connections or pumps. Two of any of the above sources of supplies being necessary for standard equipments, and in cities having fire departments, steamer connections are attached to the equipment in such manner that the fire department may pump directly into the system, reinforcing the supplies. There are two kinds of equipments, wet pipe systems in which the pipes are continuously filled with water, and dry pipe systems, the pipes of which are filled with air as far as the automatic valve which is held closed by the pressure of the air. In buildings where the temperature is such that the water in the pipes would be apt to freeze, dry systems are installed; wet systems are preferable as their operation is more prompt, and there is less opportunity for this class of equipment to become disarranged, as there is no obstruction to the flow of water when the main valve is open but the sprinkler heads. The sprinkler heads, or valves, are sealed with fusible solder melting at temperatures ranging from 165 to 360 degrees, determined by the temperature of the place in which the sprinkler is to be located. It was shown that in joist construction the space between the joists is to some extent out of reach of the distribution from the sprinkler heads, and fire obtaining headway in these spaces must be extinguished by hand. Under open joisted construction the pipes should be run at right angle to joists, not more than 10 feet apart, and sprinkler heads placed not to exceed 8 feet apart on pipes and the sprinkler head staggered—that is, the sprinkler heads to be so located as to distribute water into alternate joist channel ways.

Two sources of supply are necessary to lessen the chances of a water shortage in time of fire; one of the supplies should furnish water under a heavy pressure, that the first sprinklers opened may be as effective as possible. Public water works, having adequate sized mains and providing a continuous heavy pressure, are most desirable; next in value are pressure tanks which furnish an excellent primary supply, especially in connection with wet pipe sprinkler service; pressure tanks are not so effective for dry pipe sprinkler service, as much of the initial discharge is consumed in filling of the empty pipes; the tanks should not be placed below the top floor, and better service is obtained if located upon the roof, as less air pressure would be necessary to expel all of the water under good pressure, the tank being above all of the sprinkler heads. Pressure tanks are cylindrical in shape, constructed of steel, air tight, and the size of the tank generally used is 66 inches in diameter and 25 inches in length; total capacity 4,500 gallons; water capacity 3,000 gallons; two-thirds of the tank containing water and the remainder filled with air under pressure. The number of tanks necessary depends upon the number of sprinkler heads per floor, and if the tank supply is of a capacity to supply 20 percent of the sprinkler heads upon the floor having the greatest number, allowing 200 gallons of water per head, the supply will be considered sufficient. No tank, however, should be of less than 4,500 gallons capacity.

Greater quantities of water may be stored in gravity tanks, as no air space is required. The tanks should be of a capacity sufficient to provide 5,000 gallons for each 100 sprinkler heads upon the floor having the greatest number. The pressure of the water delivered from gravity tanks is wholly dependent upon the height of the tank above the highest sprinkler heads, and the tank should be elevated as high as possible; the bottom of the tank should not be less than 15 feet above the highest sprinkler heads. The lecturer emphasized the gravity tank as only supplementary to the main supply and was also of opinion that pumps as a source of supply to sprinklers were inferior to the others he had enumerated.

Sprinkler equipments are provided with an automatic alarm arrangement, which sounds a warning when the water within the pipe is set in motion, caused by the opening of a sprinkler head, or pipe, by accident or fire. When kept in proper order, too much importance can not be placed upon the alarm, as serious water loss may result from a small fire, which the sprinklers extinguish, if the flow of water is not checked.

Some samples of hose tested showed an excessive twist under pressure, sufficient in a length of 50 feet to loosen the couplings and cause leaks. Hose should show little tendency to twist, and the twist should be in the direction to tighten and not loosen the coupling. Cheap hose is a disappointment, and the most expensive in the end. Many fires have gotten beyond control on account of the bursting of hose just at the time when most needed.

In conclusion Mr. Henley described the fire protection equipment installed and under construction at the St. Louis Exposition.

BASIC VS. BESSEMER ACID STEEL RAILS.

The fact that one rail mill in the United States is turning out basic steel rails exclusively and the probability that the United States Steel Corporation will make a beginning in the rolling of basic rails in the not distant future, lend interest to some experiments the Swedish government has carried on to determine the relative efficiency of acid and basic rails. The London *Iron and Coal Trades Review* prints a translation from the South Swedish *Snallposten* on this subject, prefacing it with the statement that heretofore the Swedish government has used Bessemer rails of acid steel, the orders going largely to Great Britain, with an occasional one to the Cockerill works at Saraing, Belgium, which for some time were the only continental works making rails from acid Bessemer steel. The Swedish paper says:

"The railway authorities are now making trials for the purpose of comparing acid and basic steel rails. These trials will probably extend over a period of about a year, and the authorities are considering the advisability of sending a special engineer to visit various countries for the purpose of studying the question, which is an exceedingly important one from a national economical standpoint. The object is, of course, to ascertain whether it is possible to purchase material for the state railways more cheaply than hitherto, and, of course, it is a well-known fact that basic steel is considerably cheaper than that produced by the acid process. The state railways authorities have, however, from a desire to ensure the safety of the traffic, until now exclusively used acid rails. A few years ago, trials were made with basic rails which were laid for about 25 kilometers, but the result of this trial was not altogether convincing one way or the other. The usual (acid) rails showed 7 to 11 breaks in 10,000 rails laid down, while the number of breaks in a similar number of basic rails was 65; an enormous difference, and one which naturally had a great effect upon the safety of the traffic. This, of course, is the first consideration, for, although one might save a very large sum in the first cost, it might very easily be lost in case of a bad accident caused by a broken rail. It is now maintained that the defects which caused the high percentage of breakages at the first-mentioned trials have been remedied in the system of manufacture, and it will be this question that the forthcoming trials will have to decide."

E. B. Leaf & Co., Real Estate Trust building, Philadelphia, dealers in iron and steel by-products, scrap, muck bar, refined iron, low-phosphorus melting stock and specialties, have opened an office in room 1206 Keystone Bank building, of which J. W. Thurston, of the Philadelphia office, has been appointed manager.

An informal meeting of iron manufacturers was held at the Union Club, Pittsburg, on Wednesday, April 6, at which an address was made on the pig iron warrant system by George M. Hull, of New York.

EXPANSION OF OCCLUDED GASES IN CAST IRON.

In the following communication to the *Journal* of the Franklin Institute Alex. E. Outerbridge Jr., of Philadelphia, refers to some phases of his recent experiments with cast iron, that were not touched upon in his papers before the American Institute of Mining Engineers and the Foundrymen's Association:

(1) Noticing the comments of Dr. Goldsmith (entitled "Does Cast Iron Grow?") in your current issue, I would say that I think it highly probable that the pressure caused by expansion of occluded gases in cast iron plays a prominent part in the phenomena noted in my paper on "Recent Investigations and Discoveries in Cast Iron," printed in the *Journal* of the Franklin Institute, March, 1904. I believe, however, that these gases ultimately escaped through the pores of the metal which has been expanded by repeated heating and cooling, and the intermolecular spaces are now filled with air. In a paper entitled "The Mobility of Molecules of Cast Iron," read before the American Institute of Mining Engineers, at its recent meeting at Atlantic City, I stated my reasons for this belief, and in the original address given at the Franklin Institute, I performed an experiment to prove this, the account of which I omitted to incorporate in the printed paper referred to by Dr. Goldsmith.

The experiment was as follows: A small tank filled with water was placed in the lantern and its image thrown on the screen. A section, ¼ inch thick, of a cast iron test bar before being expanded by heating, and a section, of the same thickness, cut from the same bar after having been expanded 30 percent in volume, both placed in the tank, side by side, showed a surprising difference in behavior. It was observed that bubbles of gas were forced out from the entire surface of the expanded metal by the pressure of the water, while no such action took place on the surface of the untreated metal. I stated that the piece had been immersed in water several times, and the first time it gained 870 milligrams in weight, due to the absorption of water. When the piece is allowed to remain in a warm room for several hours after removal from the water, the water evaporates and air again enters to fill the void; this may be repeated many times. The metal does not appear porous to the naked eye, but photomicrographs show very clearly innumerable spaces or cracks permitting the escape of occluded gases and ingress of water or air, as the case may be.

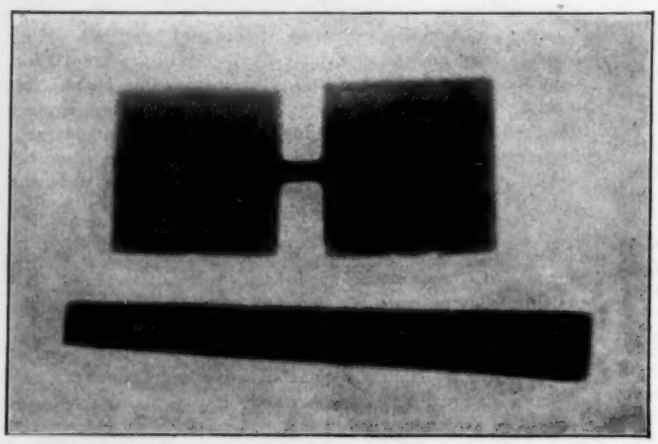


FIG. 1.—RADIOGRAPH MADE WITH RADIUM OF 10,000 ACTIVITY (CURIE'S SCALE), SHOWING REMARKABLE PERMEABILITY OF CAST IRON, BOTH EXPANDED AND UNTREATED.

(2) Quite recently Messrs. Williams, Brown and Earle, of Philadelphia, have made some interesting shadowgraphs, or radiographs, for me by the aid of radium-bromide of high activity, imported from Paris, showing that emanations from this wonderful element discovered by Professor and Madam Curie, will penetrate cast iron readily. In the halftone illustration two pieces of the same cast iron test bar, already alluded to in this communication, were cut to the same thickness, viz., 1-16 inch, one before and the other after expansion. These were laid upon a strip of lead (a metal which is almost impermeable to the emanations from radium) cut to a sort of dumbbell shape. A tube containing 100 milligrams of radium of 10,000 activity (by the Curie scale) was placed centrally by measurement, 4 inches, above the pieces of cast iron. A wedge-shaped piece of steel, of the same thickness, was placed close to the cast iron pieces, for comparison, steel being less permeable to these emanations than cast iron. After an exposure of 38 hours the negative, which was placed beneath those objects, was developed and the print made therefrom.

Several curious and interesting phenomena may be noticed, e. g., the rays passed through both pieces of cast iron, and were intercepted by the lead strip, making a distinct image of the lead strip underneath the cast iron. The central portion of the lead exposed to the rays between the two pieces of cast iron appears narrower than the portion seen through the cast iron, and looks more like a round rod than a flat strip. Also, penumbra show around the edges of the cast iron and steel, indicating that the rays are in some degree deflected around the edges. The fact that such dense metals as iron and steel are permeable to emanations from radium is very interesting, and may prove of practical value in detecting flaws. I am informed that the "X rays" will not penetrate these metals.

(3) Since my paper on recent investigations and discoveries in cast iron was read before the Mining and Metallurgical Section of this Institute, a disastrous fire has occurred at Baltimore, which has incidentally furnished convincing evidence of the great importance and practical value of a thorough understanding of the laws governing the behavior of cast iron and steel when subjected to high temperatures.

The following extract from a letter which I received from an officer of the Land Title & Trust Co., of Philadelphia, dated Feb. 9, 1904, will prove this: "The chief engineer of the Land Title building, who went to Baltimore to inspect the effect of the conflagration upon the Continental Trust Co.'s 16-story building, tells me that while the entire inflammable contents of that building were 'roasted' and consumed, the steel frame work is apparently plumb and intact. He also says that the cast iron framework of the doors (which was set in granite) has expanded to a considerable extent, and has not again contracted. He says this permanent expansion is very noticeable."

I have reason to believe that if the framework of the doors and windows of this "modern fire-proof skyscraper building" had been of light steel construction, instead of cast iron, and the doors sheathed with thin sheets of steel, or made of non-combustible material, the valuable contents of the building might have been saved from complete destruction by fire. At all events, it may be assumed that if the facts given in my paper had been generally known and understood by architects and constructing engineers, the framework of the doors and windows of the modern steel skeleton buildings would not have been made of so unsuitable a material as cast iron, and I anticipate that in future constructions of this character these errors will be avoided in view of our present knowledge and recent experience.

The *Engineering News* of Feb. 18 has an extended paper on the effects of the Baltimore fire on so-called fire-proof structures. It says: "One of the most surprising effects of the fire was the noticeable extent to which cast iron has suffered permanent bends. This effect was most noticeable in the case of iron mullions of the tall office building windows. These in many cases were bent several inches from a straight line, and in some cases these bends were veritable 'buckles' of the metal." The writer of this account, like most other observers, noticed the "buckling" and "bending," but was, apparently, unaware of the fact that all of these cast iron bars and frames had grown in cubic dimensions, and that it is this permanent growth which practically destroys the further usefulness of cast iron for such purpose after having been subjected to heat.

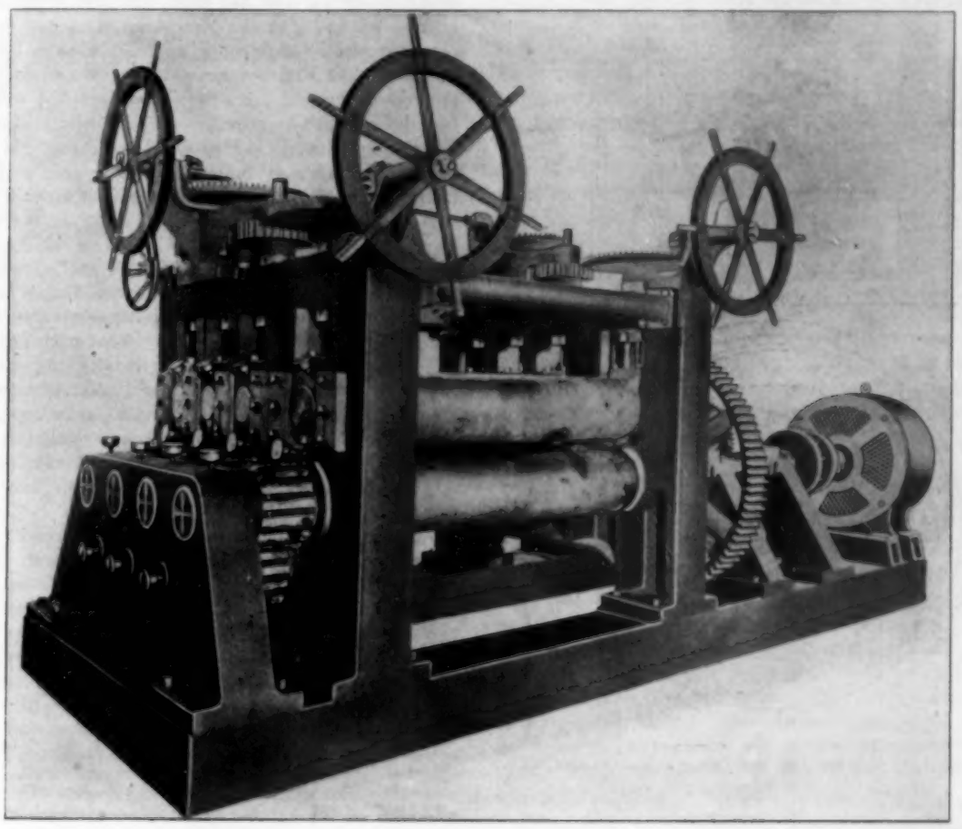
I regard the effects of the fire on cast iron in tall buildings as a timely and valuable proof of the need of correct knowledge of these phenomena, which I have been studying for years, and have recently described in the *Journal* of the Franklin Institute.

AN IMPROVED PLATE STRAIGHTENING ROLL.

The halftone illustrates a plate straightening roll recently designed and built by the Geo. Whiting Co., of Chicago, which has several features of merit that will appeal to users of such a machine. The machine, as illustrated, is of the 8-roll type, in which the two front rolls are used to "pene" or straighten plates edgeways, and was built for the North Works of the Illinois Steel Co.

The front top roll is adjustable independently at either end, and thus allows of pressure being brought to bear on either edge of the plate as it is passing through. The straightening rolls proper are mounted in the same housings, the top rolls being adjustable vertically, the back roll independently and intermediate top rolls together. Means are also provided whereby the top rolls may be simultaneously adjusted vertically when once set. Special attention has been given to means for easily removing renewable parts without dismantling the whole machine. The lower roll bearings have removable bronze bushings throughout. The upper roll boxes are held in place by caps bolted on the outside of the housings and can be readily removed. The adjusting screws and nuts are arranged for removing without the necessity of disarranging any other parts and all adjusting gears are easily removed in the same manner.

The machine is mounted on a heavy bed plate and all housings and gear stands bridge across both sides, making a very stiff and substantial construction. All driving gears are cast steel. All adjusting gears are cut from solid blanks. Hand wheels of large diameter are provided for adjusting the top straightening rolls and operating the pening rolls. Provision is also made for raising the top rolls a much greater distance above the bottom rolls than can usually be done, thus allowing more work to be done than with any other standard machine now made. As will be seen in the engraving, the machine is motor driven, having a flexible coupling between motor and gearing, thus relieving the motor from the shock of sudden overloading. The machine can be furnished with belt, engine or motor drive as desired.



AN IMPROVED PLATE STRAIGHTENING ROLL.

ELECTRIC STEEL FURNACE AT GYSINGE, SWEDEN.*

BY F. A. KJELLIN.

The problem of smelting steel by electricity attracted years ago the attention of inventors, and as early as 1879 C. W. Siemens constructed his first furnace for the smelting of metals, especially steel. His furnace was of the arc type, in which the voltaic arc was formed between a carbon electrode and the metallic contents of a crucible, the length of the arc being regulated by an electro magnetic device.

This electric furnace, as well as others of similar construction, has the inconvenience that the source of the heat—the voltaic arc—possesses a temperature of 3,700 degrees C., which is much more than that required by steel smelting. The result of the use of this intense heat is that the steel is overheated in the vicinity of the arc, while in other parts of the furnace it has not yet reached the temperature suitable for teeming. Another inconvenience is that the steel very easily takes up impurities from the electrodes consumed.

The cost of the electrodes also is an item that sensibly increases the cost of production, and the carbon monoxide resulting from the oxidation of the electrodes exerts a bad influence, as it prevents the steel from giving off the carbon monoxide dissolved in it. A more uniform heating of the steel can be obtained by passing electric currents of great intensity through the steel, and using the heat evolved by the resistance of the steel for the smelting. But as the resistance of metals, even when molten, is comparatively low, the currents used must be so great that copper cables get a section at least as great as that of the steel in the furnace.

Mr. de Leval, the well-known Swedish inventor, has tried to diminish this inconvenience by using molten slag instead of steel as resistance in his furnace; but the results cannot have been satisfactory, as the patent has been allowed to expire.

The greatest difficulty in electric furnaces of this kind comes from the electrodes, for the reason that carbon electrodes have high resistance, cause great losses of tension and power, and are soon consumed at the contact with molten steel.

*Read at the New York meeting of the American Institute of Mining Engineers.

Water-cooled iron electrodes could possibly be used, but then the magnetic properties of the iron create new difficulties. In order to get sufficient intensity of current, alternating currents must be used, and then the magnetism causes the concentration of the current at the surface of the electrodes (skin effect), and the result is great current density in the electrodes with great losses of power, and by the influence of self-induction a diminished capacity of the electric generator to convert mechanical energy into electric energy.

In order to eliminate these difficulties I proposed to Mr. Benedicks, general manager of the Gysinge works, in May, 1899, to build an electric furnace at Gysinge, without electrodes. My project was accepted, and I went to Gysinge to carry it out.

The illustration, Fig. 1, shows the principle of the furnace. An annular groove A A forms the furnace room, the sides and bottoms of which consist of refractory bricks. The covers B B close the furnace. In the center of the circle formed by the furnace room is a quadrangular core or cone C, formed of thin insulated copper wire, which continues outside the furnace, and forms with the furnace room the

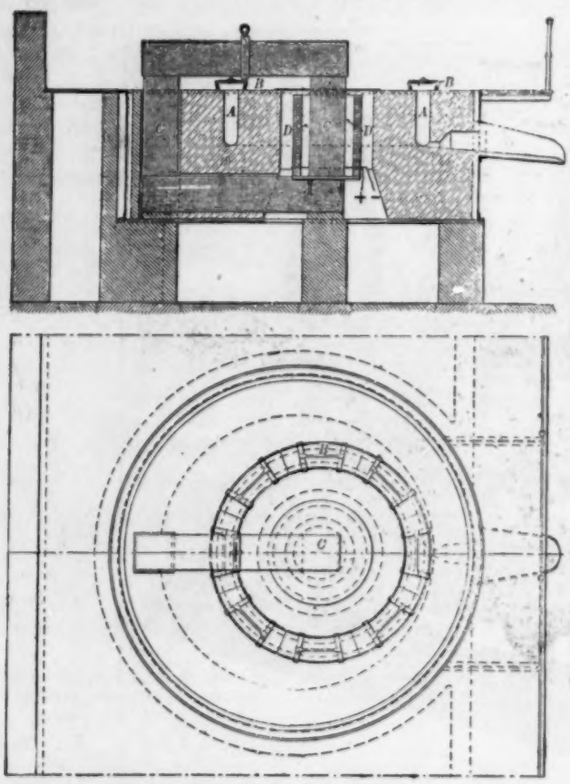


FIG. 1.—VERTICAL SECTION AND PLAN OF ELECTRIC FURNACE.

two links of a chain. The coil D D is connected with the poles of an alternating current generator.

When passing through the coil the current excites a varying magnetic flux in the core or cone, and the intensity of current in the steel is then almost the same as the primary current multiplied by the turns of wire in the primary coil. The tension of the current is naturally reduced in almost the same ratio as the intensity is increased. In this way it is possible to use an alternating current generator of high tension, and yet—without using transformers with copper cables of large sections and powers, and costly electrodes—obtain a current of low voltage and great intensity in the furnace.

In February, 1900, the first furnace at Gysinge was ready for use, and by March 18 the first steel ingot was cast, which from the beginning was of an excellent quality. The problem was then solved technically, but not economically, for, with an electric generator 78 k. w., only 270 k. g. of steel were produced in 24 hours. The next furnace built was ready in November, 1900, and produced with 58 k. w. from 600 to 700 k. g. of steel ingots in 24 hours. The changes were composed of 100 k. g., and the time between the teemings from three to four hours. The output was not fully satisfactory, because the cooling surface of the walls was too great compared with the contents of the furnace, and the cost of repairs was also rather high.

On Aug. 11, 1901, the sulphite pulp mill of Gysinge was completely destroyed by fire, and it was then resolved not to rebuild it, but to use for steel smelting the water power formerly absorbed by the pulp mill.

The new plant was ready to start in May, 1902, and has since that time worked satisfactorily. It consists of a furnace containing 1,800 k. g. of steel, from which from 1,000 to 1,100 k. g. are taken out by each teeming, and the rest left to keep the current passing. The furnace produces with 165 k. w., or 225 e. h. p., 4,100 k. g. of steel ingots in 24 hours when charged with cold materials. The electric generator gives alternating single phase current of 3,000 volts, which is directly transformed, by means of the primary coil and iron core of the furnace, into a current of about 30,000 amperes in the steel that forms the secondary circuit.

The smelting process as carried on at Gysinge produces only first-class steel, from the excellent Dannemora pig iron and weld iron, as follows:

After teeming, about 800 k. g. of metal is left in the furnace to keep the current passing, and to this is added the proper quantities of pig iron, bar ends and steel scrap as experience has proved will give the percentage of carbon desired in the resultant steel. In teeming there is always less carbon in the steel than that contained in the materials charged, for the reason that the pig iron is rusty and the steel also takes up a little silicon by reduction of the silicic acid of the lining. When the charge is molten and overheated to a suitable degree, the teeming is done in the same way as in the open-hearth furnace, by making a hole in the wall. The upper part of the furnace, as shown in Fig. 1, is on the same level as the working floor, and the charging is done simply by taking off the covers and putting in the materials. As the heat is produced in the steel itself, the slag is not so hot as in other steel furnaces, and consequently the workmen do not suffer much from the heat. The steel produced is, as mentioned above, of an excellent quality, uncommonly dense, unusually homogeneous and tough, easy to work cold when annealed, and less disposed to crack and warp in hardening than other kinds of steel. I think that the cause of these excellent qualities, apart from the good raw material used, must be due to the fact that the product contains less dissolved gaseous matter than other kinds of steel.

As every one knows, even small quantities of gases, especially hydrogen, injure the quality of steel, and the principal cause of the high quality obtained by smelting in crucibles is, in my opinion, that the steel is not in contact with the fuel gases, though it may absorb a little through the porous walls of the crucible. In the electric furnace described above, the steel has no opportunity to take up such gases or other impurities, and the quality is even better than that of the crucible steel with the same analysis.

To make special steels with nickel, tungsten or chromium, offers no difficulties, and the alloys themselves are quite homogeneous. The cost of production depends principally on the efficiency of the furnace and the price of the power. In the furnace now in use at Gysinge the losses have been proved experimentally to be 87.5 k. w., so that the effective power absorbed by the steel is $165 - 87.5 = 77.5$ k. w.; and, as those produce 4,100 k. g. of steel in 24 hours, one effective kilowatt produces about 53 k. g. of steel ingots in the same time. Every additional kilowatt in the furnace, when the size is not altered, increases the output by 53 k. g., and it is calculated within a few months, when a stronger water wheel is obtained, to produce about 6,000 k. g. of steel ingots with 200 kilowatts.

As the absolute cost of labor and repair will be the same, those costs for one ton of steel ingots will be about two-thirds of the present cost, and the price of power per ton also will be sensibly diminished. At Gysinge the cost of repair (renewing the lining of the furnace when it is worn out) was $60.

From experience with this furnace it is calculated that a furnace of 736 k. w., or 1,000 e. h. p., will produce 30,000 k. g. of steel ingots in 24 hours, when charged with cold materials. With hot materials the output is much greater. For instance, if 250 k. g. of molten pig iron are charged for each ton of steel ingots produced, the output is increased from 30,000 to 36,000 k. g. in 24 hours, with 1,000 e. h. p.

In my opinion, the costs of labor and repairs for a furnace of this type will be less than those of an open-hearth furnace of the same size; so that, where power is cheap, there is a possibility of producing a steel competing with the expensive crucible steel at a smelting cost not exceeding that made in the open-hearth furnace.

Production of Bessemer Steel Ingots and Rails in 1903.

The American Iron and Steel Association publishes this week the complete statistics direct from the manufacturers of the production of Bessemer steel ingots and castings in the United States in 1903, also of Bessemer steel rails by the producers of Bessemer steel ingots.

Ingots and Castings.—The total production of Bessemer steel ingots and castings in 1903 was 8,577,228 gross tons, against 9,138,363 tons in 1902, a decrease of 561,135 tons, or over 6 per cent. The production of 1902 was much the largest in our history.

The following table gives the production of Bessemer steel ingots and castings in the last six years. Of the production last year 17,099 tons were steel castings, against 12,548 tons in 1902.

Years.	Ingots and Castings. Gross tons	Years.	Ingots and Castings. Gross tons.
1898	6,609,017	1901	8,713,302
1899	7,586,354	1902	9,138,363
1900	6,684,770	1903	8,577,228

Below we give by states the production of Bessemer ingots and castings in the last four years.

States—Ingots and castings.	1900. Gross tons.	1901. Gross tons.	1902. Gross tons.	1903. Gross tons.
Pennsylvania	3,488,731	4,293,439	4,209,326	3,909,436
Ohio	1,388,124	2,154,846	2,528,802	2,330,134
Illinois	1,115,571	1,324,217	1,443,614	1,351,968
Other States	692,344	940,800	956,621	985,690
Total	6,684,770	8,713,302	9,138,363	8,577,228

There were no Clapp-Griffiths works in operation in 1903 and only two Robert-Bessemer plants were active. Seven Tropenas plants were at work, as compared with 5 in 1902. In addition one plant made steel by the Bookwalter process and one plant on the Pacific Coast made a small quantity of steel in a special surface-blown converter. One plant also made steel by the Evans-Wills process. All these active works produced steel castings only.

Rails.—The production of all kinds of Bessemer steel rails by the producers of Bessemer steel ingots in 1903 was 2,813,583 gross tons, against a similar production in 1902 of 2,876,293 tons. The production in 1903 was 62,710 tons less than in 1902, when the maximum production was reached.

The following table shows the production by states of Bessemer steel rails by the producers of Bessemer steel ingots in the last four years. Included in the figures given are 13,248 tons of renewed rails rolled by mills operated by companies which manufacture Bessemer ingots.

States—Rails.	1900. Gross tons.	1901. Gross tons.	1902. Gross tons.	1903. Gross tons.
Pennsylvania	1,195,255	1,406,008	1,148,425	1,125,546
Other States	1,166,666	1,430,265	1,727,868	1,688,037
Total	2,361,921	2,836,273	2,876,293	2,813,583

The following table separates the production of rails weighing 45 pounds and less than 85 pounds to the yard from those weighing less than 45 pounds and over 85 pounds to the yard. Bessemer rails made from purchased ingots or from rerolled rails by companies which do not manufacture Bessemer ingots are not included.

States—Rails. Gross tons.	Under 45 pounds.	45 pounds and less than 85.	85 pounds. and over.	Total. Gross tons.
Pennsylvania	97,697	571,271	456,578	1,125,546
Other States	79,964	927,407	680,666	1,688,037
Total for 1903	177,661	1,498,678	1,137,244	2,813,583
Total for 1902	227,068	2,004,063	645,162	2,876,293
Total for 1901	140,214	2,202,237	493,822	2,836,273
Total for 1900	154,796	1,605,067	602,058	2,361,921

Tnere was a large increase in 1903 in the production of Bessemer steel rails weighing 85 pounds and over as compared with 1902 and a considerable decrease in rails weighing 45 pounds and over and less than 85 pounds. The production in 1903 of rails weighing less than 45 pounds also shows a decrease.

The total production of rails in 1903 will include rails made from open-hearth steel, rails rolled from purchased Bessemer blooms, rails rerolled by non-producers of Bessemer steel ingots, and iron rails. The total from all these sources in 1902 amounted to 71,640 tons.

I. C. Hirsch Iron, Steel & Rail Co.

The project for an important iron, steel and metal working concern, in Cincinnati, under the name of the I. C. Hirsch Iron, Steel & Rail Co., has taken shape. I. C. Hirsch, formerly of St. Louis, and for some years vice president and general manager of a large business of this kind, is the active agent in the new enterprise. A twelve-acre site has been secured at Ivorydale, O., upon which will be built a foundry 110 x 320 feet, machine shops 200 x 350 feet, locomotive and car repair shops 400 x 500 feet, and plans and specifications are now in the hands of the architects. The rest of the twelve-acre site will be used for storage of rails, iron and steel of every kind, railroad spikes and railroad supplies, iron and steel scrap, and for storing second-hand cars, locomotives and railway equipment. Storage ware houses are to be provided and a private switch will run into the yards. The plant will employ about 300 men from the start. General offices in the new First National Bank building have been secured in which will be employed 16 people at the beginning.

The company will be an Ohio corporation and is understood to have backing of over a million dollars. Associated with him in the enterprise will be W. B. Kahn, a retired capitalist, formerly president of the Atlas National Bank and vice president of the German National Bank, of Cincinnati. It is proposed to deal in all lines of iron and steel, and to carry in stock, make or contract for everything in these lines required by manufacturers and railroads. Branches or sales and purchasing agencies will be established in Chicago, Pittsburg, New York, New Orleans, Kansas City, Denver and San Francisco. A specialty will be made of handling iron and steel scrap, old rails and old railway material, relaying rails and rails and iron and steel cut to specifications for building and construction of all kind. An interest has been secured in a waste factory through which arrangement the company will be able to compete successfully.

The Pittsburg Ore Dust Decision.

(Special Telegram.)

PITTSBURG, April 13.—In the common pleas court this morning the issue of a formal order making the injunction against the Jones & Laughlin Steel Co. as decreed by the supreme court of Pennsylvania perpetual was postponed until next Thursday. The attorneys for the steel company in this ore dust suit contended that the motion for a re-argument of the case had not been passed upon by the supreme court and until this is done no formal order can be issued by the lower court enforcing the injunction. Unless this motion is passed upon by the supreme court before next Thursday the injunction will become effective on that date.

Frank Kempsmith, head of the Kempsmith Mfg. Co., from 1888 to 1901, died in Milwaukee, April 10, aged 55 years 11 months. Mr. Kempsmith had been in failing health for some time; it was owing to this cause that he retired from business three years ago. His malady was sarcoma. Mr. Kempsmith began his mechanical career at the early age of 13 years, and he developed into an exceedingly skillful mechanic, which coupled with his common sense and appreciation of the requirements of the work in hand, made of him a man of whom the superintendent of one of our most prominent tool-building concerns once said, "I consider Frank Kempsmith one of the best mechanics that ever worked in our place. He had the skill and the nerve to make a job exquisitely fine when it was required to be so, and at the same time he had the good judgment to stop work on a job as soon as it was good enough for the purpose it was to serve." He had worked for the Brown & Sharpe Mfg. Co., the Garvin Co. as draftsman and as superintendent for Warner & Swasey at Cleveland. Afterwards he went into business in Springfield, O., where he had formerly been employed as toolmaker. He removed to Milwaukee about 16 years ago, originated and developed the milling machine which bears his name and established a good business.

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BESSEMER STEEL IN 1903.

The official statistics of Bessemer steel production in the United States in 1903, as given elsewhere in this issue, show a distinct falling off as compared with 1902. The significance of this, apart from the sudden shutting off of business in the iron trade in November, may appear when the production of open-hearth steel for 1903 is ascertained. The point of special interest is whether open-hearth steel was a larger percentage of the total steel output in 1903 than in the two years preceding. It is noteworthy that the steel rail production of last year was close to that of 1901 and but 122,000 tons less than that of 1902. The amount of Bessemer steel entering into other products last year fell off more markedly, and considerable of the decline may have been due to the shortened operations of independent tinplate, sheet, tube and wire mills which bought steel in the market.

In the table below are given the official figures for the production of Bessemer steel in the United States in 1875, 1880, 1885 and succeeding years, together with the production of steel rails in the same years, and the percentage of Bessemer steel finished in the form of rails.

Year	Bessemer Ingots Gross Tons	Bessemer Rails Gross Tons	Per Cent Rails
1875	335,283	259,699	78
1880	1,074,2?2	852,196	80
1885	1,519,430	959,471	63
1886	2,269,190	1,574,703	70
1887	2,936,033	2,101,904	71
1888	2,511,161	1,386,277	55
1889	2,930,204	1,510,057	51.5
1890	3,688,871	1,867,837	50
1891	3,247,417	1,293,053	40
1892	4,168,435	1,537,588	37
1893	3,215,686	1,129,400	35
1894	3,571,313	1,016,013	28
1895	4,909,128	1,299,628	26.4
1896	3,919,906	1,116,958	28.4
1897	5,475,315	1,644,520	30
1898	6,609,017	1,976,702	30
1899	7,586,354	2,270,585	30
1900	6,684,770	2,383,654	35.7
1901	8,713,302	2,870,816	33
1902	9,138,363	2,935,392	32
1903	8,577,228	2,813,583*	33

*Not including rails rolled from purchased Bessemer blooms and rails re-rolled by non-producers of Bessemer Ingots.

The showing is of interest, both as to the expansion of production in Bessemer steel and as to the marked increase in the use of Bessemer steel in products other than rails. It will be noted that there have been considerable fluctuations in Bessemer steel production, and that, as with pig iron, advances have been followed by recessions, and these by fresh forward movements establishing new records. This is in contrast with the history of open-hearth steel manufacture, which in recent years has been an uninterrupted advance. The contrast for recent years will appear in the following statement:

Year	Bessemer Ingots	Open-Hearth Ingots
1897	5,475,315	1,056,043
1898	6,609,017	1,569,412
1899	7,586,354	2,080,426
1900	6,684,770	2,545,091
1901	8,713,302	3,618,993
1902	9,138,363	4,496,533
1903	8,577,228	.....

The falling off in the consumption of plates and structural shapes in the latter part of 1903 would suggest the probability of an interruption in the steady advance of open-hearth steel, and the official statement will therefore be of special interest, as reflecting the resultant of two forces—one, the general business condition, the other, the increasing tendency to use open-hearth steel. This year so far Bessemer steel has been prominently in the ascendant. While rail production has been less than 50 percent of the average for the past three years, the other outlets for Bessemer steel—wrought pipe, wire products, tin plates, bars and sheets—have been active, all but sheets conspicuously so. Plates and shapes, which furnish the greater part of the demand for open-hearth steel, have fallen off notably. Exports, moreover, have been very largely of Bessemer steel products. The outlook for 1904, therefore, is for the full maintenance of the Bessemer steel percentage, if not its increase.

The first table presented above shows how largely the Bessemer steel tonnage in earlier years was absorbed by rails; how other outlets were gradually developed; how in the panic years the rail demand fell to its lowest proportions; how at the same time cheap Bessemer steel led to its increased use in wire, sheets, tin plates and tubes; how in recent years prosperity has brought an unprecedented demand for rails, so that in spite of the enormous increase in Bessemer tonnage for other products the rail percentage has been drawing closer to that attained in the years before the depression of the nineties.

A contrast is afforded by the course of the Bessemer steel industry in Great Britain which has been practically stationary in the past 20 years; but a more conspicuous fact is that the British output of 20 years ago was greater than anything that has been attained since. In 1903 it was 1,910,018 tons, of which 1,316,915 tons was acid Bessemer and 593,103 tons basic Bessemer. The acid Bessemer output in the United States last year was thus 6½ times that for Great Britain. The Bessemer steel rail output in Great Britain was 1,061,441 tons last year, or 55.5 percent of the Bessemer steel total. We must go back to 1888 to find any such percentage of the Bessemer production absorbed by the rail trade in the United States.

THE ADVANCE OF ELECTRICITY.

The conquests of electricity in the industrial world are being made with startling rapidity and give promise

of results at once wide in extent and far-reaching in time. That manufacturers of machinery, especially makers of reciprocating engines, are alive to the situation is evinced by the alliances which they are making with important factors in the electrical field. The most conspicuous example of this is the recent affiliation of the Allis-Chalmers Co. with the Bullock Electric Mfg. Co. at Cincinnati; but there is a host of other changes of a similar nature throughout the country, with others still likely to follow.

The popularity of the steam turbine as an electrical drive is also causing some innovations in manufacturing lines. In fact the machinery trade generally is quietly but surely being revolutionized through the inroads which electricity is making upon the domain of steam.

Attention is also called to this tendency of electricity by the building of large central power stations, both East and West, which furnish light and power to small manufacturing industries that heretofore have maintained individual power plants. Many new enterprises, too, which under the conditions of a few years ago would have called for the purchase of engines and boilers, today—consulting economy—are making contracts with the central electrical stations. This is resulting in small orders for engines and high pressure boilers and in turn these small sales are being reflected in a light demand for boiler plates and tubes. It is in the West, however, rather than in the East where these latter conditions especially prevail.

The vitality in the electrical field is not confined to the United States. Germany and France and even England have taken greater strides recently than the United States. It is chiefly due to the needs of the electrical industry that unprecedented exports of copper have been made from this country to Europe since the beginning of the current year. Within the last three weeks there has also been a larger consumption of copper by domestic melters.

Official returns show that up to the close of the first week in April over 72,000 tons of copper were exported from the United States to European countries, being more than twice as much as was shipped during the corresponding period in 1903 and considerably more than was shipped during the first seven months of last year.

Although the domestic production of copper at the present time is greater than ever in the history of the mining industry and imports are averaging 7,000 tons per month, the surplus stocks of copper which existed at the beginning of this year have almost disappeared under the marvelous absorptive power exhibited by the electrical trade and other manufacturers of copper products in Europe.

Within the last few weeks the home demand has been greatly stimulated, resulting in an advance of from ⅜ to ½ cent per pound in prices of refined copper during the last week. It is an interesting fact that domestic consumers of copper scarcely ever anticipate their wants, buying only to cover contracts for wire, tubes, sheets and other finished material. The increased business on this account, however, together with contracts for export, has taken up the current production of domestic mines for the months of April and May, which is now causing further drafts to be made on surplus supplies concentrated in the hands of the largest producing interests.

Another interesting fact showing the direction of the trade winds is the increased export trade in mining machinery and electrical apparatus, including power plant equipment for foreign enterprises which are to be electrically driven.

Eastern manufacturers of electrical machinery have recently been conspicuous purchasers of foundry iron, giving further evidence of the preparations making to meet the increased demand for electrical equipment. The constant buying of motors for machine shops is another fact pointing in the same direction.

It is a feature of the greatest significance that augurs well for future development that the sentiment of the managers of some of the largest steam railways is in favor of electricity replacing steam as a motive power. The opinion is expressed by many railway experts and engineers that such a change is not only feasible but probable within a relatively short time.

Personal.

Albert Patton has resigned his position at the Ohio works of the Carnegie Steel Co., to become superintendent of the converting department of the Lackawanna Steel Co.'s plant at Buffalo.

W. S. Hutton has been appointed assistant superintendent of the blast furnace department of the Colorado Fuel & Iron Co.

The directors of the Fort Wayne Iron & Steel Co., of Fort Wayne, Ind., have elected W. J. Vesey, C. H. Rawlins and James McKay to fill the vacancies created by the retirement of the Chicago members of the board who ceased to be stockholders recently. C. H. Rawlins was elected vice president in place of J. W. Moody, resigned.

Ernest W. Saunders, recently with the American Machinery Co., is now in the New York office of the J. R. Vandyck Co. as machinery salesman.

C. M. Schwab has gone on an extended trip to the Pacific Coast.

J. Waddell, who was assistant to Jonathan Warner, of the American Sheet & Tin Plate Co., Pittsburg, who recently resigned, has also tendered his resignation which has been accepted

W. Williams, formerly assistant superintendent of the tube department of the Wheeling Steel & Iron Co., Wheeling, W. Va., has been promoted to the position of superintendent to succeed Frank Bangert.

Christian Flinn, superintendent of the Allegheny plant of the Pressed Steel Car Co., Pittsburg, has been appointed assistant manager of all the company's plants.

Captain Amos K. Tappan, a veteran of the civil war and for more than a quarter of a century a steam pump manufacturer in Chicago died at his home, in that city, April 10, after an illness of a few days. Captain Tappan established and operated the Tappan Steam Pump Works.

The Mansfield Engineering Co., Mansfield, O., has been declared bankrupt, with the consent of the directors, and S. A. Jennings and F. H. Marquis, of that city, have been appointed receivers by Judge Wing of the United States District Court. A schedule of assets and liabilities has not yet been filed. The company is the successor of the Century Machine & Mfg. Co. and the Mansfield Machine Works. W. C. Lloyd is president and treasurer, and Thos. Hall general manager. It manufactures automatic steam engines, special machinery, structural work, air furnaces, cupola iron castings and patterns. The court orders that the receivers continue the operation of the plant to complete contracts on hand, which include one for tables for the Pittsburg Plate Glass Co. and one for gun carriages for the Government. It is understood that embarrassment in carrying out the later contract hastened the bankruptcy proceedings.

The Labor Situation.

WHY THE SANTA FE ROAD INSISTS ON THE OPEN MACHINE SHOP.

J. W. Kendrick, third vice president of the Atchison, Topeka & Santa Fe railway system, has just issued in pamphlet form the ruling of his office on the demand made by the International Association of Machinists for a contract with the Santa Fe system covering all its machine shops. It is a judicial document, temperate in tone, and consists largely of a bare mention of the Santa Fe system's experience with the representatives of the machinists' union, and addressed to D. W. Roderick, manager Midland Associated District, I. A. M., and Hugh Doran, member executive committee, I. A. M., Chicago. The opening portion of the letter is as follows:

Gentlemen: In June, 1902, I met Mr. James O'Connell, president of the I. A. M., for the first time, and, in the course of conversation, ased him for what purpose the organization of which he is the head, was maintained. He replied, "To elevate and improve the mechanic, and to promote a better feeling and understanding between the employer and the employed." I told him if this was the case, we should be able to work together. Immediately after this conversation, a strike occurred at Cleburne. During the interview on March 23, 1904, I stated that the I. A. M. could not, in our opinion, control its men (see page 6, clause 24, of report of the proceedings). In substantiation of this, I quote the following telegraphic correspondence between myself and President O'Connell, through the office of our superintendent of terminals, Mr. J. W. Walker, at San Francisco:

"CHICAGO, July 26, 1902.

"J. W. Walker, San Francisco:

"See if you can locate James O'Connell, president of the Machinists' Union of the United States, said to be in San Francisco on vacation. Ask him to communicate with me by wire, and say to him that in spite of anything which he may have heard to the contrary, our position is as stated to him during our interview in Chicago, and that I wish his assistance in dealing with the matter at Cleburne, and some others of similar nature, and would like to see him for this purpose at once. That in the meantime, I earnestly hope that the situation may not be further complicated. Remind him that I have not been honored by a call from him or any of his representatives, in connection with these matters, and in view of the expressions of good will which were exchanged upon that occasion, I do not understand why this should be the case. I will much appreciate it if he will direct Mr. Mulberry, who is at present in Cleburne, I believe, to come to Chicago to see me. Acknowledge receipt, and report progress promptly.

(Signed) J. W. KENDRICK."

"SAN FRANCISCO, July 26, 1902.

"J. W. Kendrick, Chicago:

"O'Connell located at Grand Hotel, San Francisco, where will be until Monday noon; goes San Jose Tuesday, be in Los Angeles Thursday and Friday. Expects reach Chicago via Santa Fe Monday evening, Aug. 4. In personal interview, says he still maintains same position as stated to you, but as Cleburne matter has arisen since he left Washington, he is not conversant with cause. Matter has been handled by Vice President P. J. Conlon, through whom he will get in touch with Cleburne situation; telegraph tomorrow or next day either direct or through me. Signed) J. W. WALKER."

"CHICAGO, July 27, 1902.

"J. W. Walker, San Francisco:

"Say to O'Connell that on morning of July 8, Hess, who happens to be president of the union in Texas, and who has for some time been in our employ, demanded that he be allowed to run a planer; as he had been absent a great deal, and was very irregular in his attendance in the shop, the planer had been assigned to another man. He was told by foreman that he could not have the planer, and the reasons were given as stated above; but he was also told that other work would be assigned to him. He said that if he could not run the planer he would do nothing, and that he would call the men out in support of his position, which he immediately did. Strike has been going on for two weeks, and we have nearly full force of new men. Mulberry arrived in Cleburne about a week ago, and I am told was in doubt at first as to the merits of the men's case, but they represented to him that the company made use of the planer incident to force a strike for the purpose of breaking up the union. I can only say to Mr. O'Connell that this is absolutely false, and on the other hand it is the strongest claim the men could make in order to secure support of the union. This is precisely the case that I discussed with him, where a man who happens to belong to the union undertakes to manage the affairs of the company and to use influence with the men to strike, to secure something to which he is not entitled. This is precisely the kind of proceeding which O'Connell told me he would not support. Mulberry is reported to have promised men support of the union, and to call out men in other shops for the purpose of forcing us to take back all of the men, including Hess. O'Connell will understand that if we take this step the conditions at Cleburne, which have always been bad, as I very frankly told him, will be much worse in the future. This is the first case which has arisen since my conversation with him; and as he has not altered his position, and as mine is unchanged, we should be able to settle the entire difficulty without sacrifice on either side. I wish all our men to understand that it is a bad plan to strike first and negotiate afterward. O'Connell agreed with me as to this, and told me that the laws of the order made it impossible, and yet, for the very cause mentioned, one man was able to bring about a general strike. I can prove my statements as to the cause of this, to O'Connell's entire satisfaction, and am wiring this fully in order to do everything I can to carry out the understanding arrived at during our recent interview in Chicago. If matter is left to party now in Texas, I have reason to believe that trouble will ensue, and it is wholly unwarranted by anything this company has done. (Signed) J. W. KENDRICK."

"SAN FRANCISCO, July 28, 1902.

"J. W. Kendrick, Chicago:

"Delivered translated copy your message to O'Connell yesterday, and in conference with him this morning he has shown me telegrams from his office at Washington, and Mulberry, at Cleburne, which practically corroborate your statement of Hess case. O'Connell thinks that, if facts are as represented, there will be no serious difficulty in adjusting. Has taken steps calculated to stop spread of strike other points, pending arrival Mulberry in Chicago, where he has been instructed to go and see you, after which, if he is unable to settle the matter, no further steps are to be taken until O'Connell reaches Chicago to see you, and deals with the matter personally. His information is that entire union committee at Cleburne have been discharged, but he suggests advisability furnishing passes for, and inviting them, accompany Mulberry to Chicago, if difficulty not straightened out, latter will detain committee until O'Connell arrives, according itinerary previously given you. He incidentally told me his Washington representatives had sat down pretty hard on Cleburne committee, and were putting forth every effort to uphold the by-laws and constitution of the order. I inferred, although he would not say so specifically, that Cleburne lodge had been reorganized; at least he told me that they had put in a new secretary, and I gained the impression that the local committee has not been working harmoniously with the general officers of the order.

(Signed) J. W. WALKER."

The strike was illegal according to the constitution of the I. A. M. Still, it was not so declared, and notices were published monthly in the *Machinists' Journal*, warning men to keep away from the Gulf, Colorado & Santa Fe (see *Journal* for August, 1902, pages 521 and 526; for September, 1902, pages 611 and 622; and for October, 1902, page 707). The strike dragged along until Aug. 27, nearly two months. The company was put to a great deal of expense and inconvenience because of the inability of the officers of the I. A. M. to control their men, and their failure to declare the strike illegal and the shops fair, because they feared to incur the displeasure of the lawless element in the order, which was not amenable to reason or control.

[The letter goes on to recount the agitation of one Wilson, an organizer of the union, who went among the Atchison men. Wilson, after an interview with General Manager Mudge, made the statement that he was "stubborn, discourteous and wholly unfit for the position he holds." This opinion was partly influenced by Mr. Mudge's statement that the men were satisfied until Wilson came among them. The men at Topeka were urged by Wilson to make Mr. Purcell get rid of the non-

union men in the shops at that point. Later at a banquet in Topeka, Wilson severely criticised the action of the superintendent of shops and general foreman. Wilson at an open meeting arraigned officers of the company in the bitterest terms. He also said that O'Connell and President Ripley of the Santa Fe system, are great friends and that O'Connell and Mr. Ripley were in touch with each other. In another speech Wilson said that a man was foolish not to join the union, because having done so, he "would not have to work himself to death." All these things Vice President Kendrick recounts as indicating that the International Association of Machinists does not "promote a better feeling and understanding between the employer and the employed," also that the chief union officials cannot control their subordinates or the men. In urging the men on the Santa Fe system to strike, Wilson said that in the event of trouble he would bring men to the road who would soon cripple the engines, as had happened on the Pacific railway by putting quicksilver in the boilers. He said the Santa Fe did not want any trouble, for they knew just what trouble was. "They know we can put an engine on the bum, just as we did on the Union Pacific, by putting quicksilver or soap in the boiler, as we did on the U. P. No, the Santa Fe officials are too wise for these things. It is, give us our shop rules and regulations or we strike, and strike we will not have to do." Mr. Kendrick's letter then resumes as follows:]

In February, immediately after a conference with President O'Connell and Mr. Doran, at which time a general arrangement was made for a meeting to take place on or about March 17, having occasion to go to Topeka, the writer saw a copy of the machinists' *Journal*, containing the usual stereotyped notice to machinists to keep away from the Santa Fe system, and sent the following message to Mr. O'Connell: "Journal of your order for January contains notice to men to keep away from Santa Fe system. Why? (Signed) J. W. Kendrick," to which the following reply was received:

WASHINGTON, Feb. 17, 1904.

"J. W. Kendrick, Topeka:

"Notice to keep away from Santa Fe got into Journal in February, not January, through our editorial department, by request of Santa Fe employes, who were of opinion that company was unnecessarily employing mechanics of an objectionable character; the notice to stay away was published before I was aware of the same, or it would not have appeared.

(Signed) "JAMES O'CONNELL."

In spite of the assurance contained in Mr. O'Connell's wire, the issue of this magazine for March, 1904, contained a similar notice (page 207). An organization which keeps a notice of that kind in its magazine practically all the time, can hardly be characterized as "friendly."

In the settlement made with the Union Pacific road, that company reserved the right to retain in its employ mechanics who came to it during the strike. Ascertaining that this was the case, I asked President O'Connell and Mr. Hugh Doran, during a recent interview in my office, what right our men had to object to the employment of men who had worked for the Union Pacific. The answer was, "None, whatever;" and yet the principal plank in the platform on which the recent campaign against this company has been conducted, has been the exclusion of non-union men from the shops of the Santa Fe system. Mr. Wilson told the writer in Topeka, in the presence of General Manager Mudge and Assistant Superintendent of Motive Power Lovell, that the right of the company to maintain open shops was conceded. Of course, his attitude and utterances during the crusade against this company and its interests prove that this was not intended; that the shops might be open in theory, but that the order men therein would be expected to see that they were, in fact, closed to any but their brothers.

Continually clamoring for recognition, more compensation, and less work, the men who represent this movement desire to shackle their employer, and to deprive those artisans who do not agree with them, and who will not join their incendiary march, of the means of earning an honest livelihood.

The growth of this order upon the Santa Fe system has been watched very carefully during the last two years. It has not been particularly successful. There is not a shadow of a reason for a demand upon the part of this order to control the actions or policy of the employes of the Topeka shops, because the union in those shops is feeble and not representative of the principles or wishes of the majority. The formation of a distinct lodge under the direction of Mr. Wilson proves this. Official representation in this lodge was conferred in accordance with the standing of the various shops, from an order standpoint.

Topeka was given no representation, because the men are not sufficiently "progressive." Mr. Wilson has never failed to ridicule the "non-progress" of the men at Topeka—the men who own homes, who are good citizens and who believe that they can spend their time to better advantage than by attacking their employing company, which thoroughly appreciates their loyalty and fidelity. The management does not believe the shops at Shopton are as badly addled by this unhealthy movement as would seem to be indicated by the fact that the president of this district was selected from that shop. It does not believe that the men at Cleburne feel they were unjustly dealt with, after the event of two years ago, or that there is any reason for making war upon their employer. In fact, it is true that many of the men were practically "clubbed" into the union, as stated by Mr. Wilson in his speech at Pueblo. As a man told the writer, during his recent trip through the West, he was "fired into the union," and thought it very likely that he might in time be "fired out."

It appears from page 158, clause 646, of the record of the meeting, that Mr. Roderick said, "Even as to his (a man's) record, I would have objection to it"—meaning that the company has no right, in hiring men, to ask for their record with respect to previous experience, place of occupation, reason for leaving same, etc.

On page 192, clause 814, it appears that Mr. Smith, secretary of the recently organized district lodge, feels that it is very essential to know something concerning the record—of a non-union man. To quote:

"Mr. Smith: Let me tell you. If a non-union man comes into a shop it doesn't take very long to know what his record is. While we don't ask him to fill out any formal application, or anything of that kind, somebody knows him. If that man is all right and has no bad record, that man is taken in and treated with just as much courtesy as if he was a card man, with this exception: if he is willing or signifies his willingness to do the right thing by the rest of the members in the shop, and will fill out an application, he is all right; if not, he is not."

"Mr. Kendrick: That is, he must fill out an application for membership in the order?"

"Mr. Smith: Certainly, or signify his willingness to do so."

"Mr. Kendrick: And that is what you call an open shop?"

Thus it appears that the records of non-union men will be subjected to most searching inquiry, but that the company's right to demand information as to a man's antecedents, as a condition of employment, is challenged.

Again, Rule XII provides for the promotion of machinists in the service to positions of foremen or gang bosses, when vacancies occur, "seniority, character and proficiency to govern." In commenting upon this rule the writer said:

"Whenever we have in our service men of recognized loyalty and ability, who have worked for the company a sufficient length of time to merit promotion, it will be a pleasure to advance their interests, and our own, by placing them in such positions. Loyalty, however, will be a condition of first importance."

Mr. Roderick says, in regard to this requirement (page 137, clause 533):

"In my remarks on the subject I would not have it for a moment understood that I advocate disloyalty to a company."

"Mr. Kendrick: Only you make it a secondary consideration."

"Mr. Roderick: As compared with ability, yes."

While disloyalty may not have been advocated by Mr. Roderick—and the writer does not wish to charge that it was—the rule proposes to make it incumbent upon the company to promote senior machinists of good character and recognized proficiency, loyalty being relegated to a secondary position, at least according to Mr. Roderick's admission. Acquiescence in this rule would mean that the company would be called

upon to promote men according to seniority, because there might be nothing to choose between two or more men, upon the ground of relative proficiency. Plainly, the objection of this company to promotion of men upon the condition prescribed in this rule, is the fact that strong "order" men have a greater loyalty to the order than to the employing company. If order men are promoted, it means that none but order men will be employed in a shop. Various pretexts will be found for getting rid of non-order men.

The company has a right to insist, and will do so, that its officers shall not belong to any organization, the members of which can, under any circumstances, become opponents of the proper policy of the company.

The record that has been made during our conference, especially on pages 183 to 201, inclusive, clauses 748 to 868, inclusive, as to what the term "open shop" means from your standpoint, makes the matter perfectly clear. It amounts to this—that the shops shall be "open," to all practical intent, to union men only. The position of the order that you represent is so entirely different from that taken by the four standard orders with which we have relations—namely, the Order of Railway Conductors, Brotherhood of Railway Trainmen, Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen—with respect to the employment of men, as to typify (if non-union men are to be discriminated against, and practically deprived of the means of earning a livelihood) the essential difference between barbarism and civilization. The four orders above named do not persecute their fellow men. We do not know how many of the conductors, trainmen, engineers and firemen in our employ are members of these orders. We do not care. Our business relations with them are not attended by more friction than would exist in connection with the transaction of business of corresponding magnitude between persons or firms. They do not, as the experience of this company, and the statements made by your committee, seem without question to prove, discriminate against men who do not belong to their orders. This company has non-order men among its conductors, its trainmen, its engineers and its firemen. That they, choose to remain so is their own affair, and is so regarded by the officers of the company and of these standard railway orders.

For the reasons stated herein—namely (first), inability of the officers of your organization to control its men, as evidenced in the two important cases in the experience of this company during the last two years; (second) the attitude of the representatives of your organization in proselyting among the employes of this company during the past nine months, during which time little was said, and then only for effect, regarding the interests of this road, and much was said touching upon the entire practicabilty of destroying the company's property, in case it failed to agree on the conditions that were to be prescribed; (third) because of the fact that the shops of this system must, and shall be, "open" in the true sense of the word, not only to union men, but to any artisan who can, and will, faithfully and skillfully do his part in the work incident to the mechanical operation of this road—we must, and will (until such time as you have shown by a different policy than has thus far characterized your dealings with this company, that you are worthy of the confidence that we must, for the present, withhold), decline to make any contract with your organization. We desire to promote the interests of our employes in every practicable way; but we can not, do not, feel that these aims would be advanced by the treaty that you propose.

The Constitution of the United States guarantees to every citizen, whatever his position in society, absolute protection in the enjoyment of the rights of a free man. The Constitution has not, thus far, been amended so as to confer upon any organization the power to discriminate against any man or class of men. Our mechanics who are endeavoring to do so are without any standing in law, in equity, or in right.

It is perfectly evident that any agreement which would accord recognition to the organization to which you belong would result in forcing every man on the road to belong to your order, if it chose to take them in, or leave our service.

NO EIGHT-HOUR LEGISLATION.

There will be no eight-hour bill passed by the present Congress. Instead of agreeing to report favorably to the House the Hitt bill fixing eight hours as a day's labor on government contracts, the House Committee on Labor decided on April 7 by a vote of 6 to 3 to refer the entire subject to the secretary of the Department of Commerce and Labor, with the request that he investigate the subject matter of the bill and report next December his conclusions with regard to the following questions:

First.—What would be the additional cost to the United States of the various materials and articles which it customarily procures by contract which would be governed by the limitations sent out in the said bill?

Second.—What damage would be done, if any, to the manufacturing interests affected by the provisions of the bill, if enacted?

Third.—Whether manufacturers who have heretofore furnished materials and articles to the government under contract would continue to contract with the government if such contracts were within the peremptory eight-hour limitations provided by the said bill.

Fourth.—What would be the effect of the enactment of the said bill, if any, upon the export trade of the country?

Fifth.—Are the laborers of the country organized and unorganized, who would be affected by the proposed legislation willing to have taken away from them the rights to labor more than eight hours per day, if they desire to do so?

Sixth.—What effect would this proposed legislation have, if any, upon the agricultural interests of the country?

Prior to the adoption of the resolution it was moved that the committee favorably report the eight-hour bill. This was defeated by the same vote of 6 to 3.

The Senate Committee on Education and Labor has concluded its hearings on the eight-hour bill, and the whole time at the last meeting was consumed by the argument of Samuel Gompers, president of the American Federation of Labor, in favor of the bill. Mr. Gompers briefly detailed the history of the effort of organized labor to procure the enactment of such a law in previous Congresses, and said that the present bill was the work of Representative Gardiner, of New Jersey, and not of him or any other person connected with the American Federation of Labor. He took up, one by one, the various objections that had been presented to the committee by the opponents of the bill.

VICTORY FOR ARBITRATION IN NEW YORK.

After refusing twice to obey the orders of their own accredited representatives to return to work pending arbitration of all disputes, the bricklayers and laborers who had been on strike in New York city capitulated a few days ago and declared the building strike off pending arbitration of all disputes. Before this action was taken several conferences were held. At a meeting of the general arbitration board of the Building Trades Employers' Association members of the arbitration board of the bricklayers concurred in a resolution that the bricklayers and laborers return to work under the conditions that obtained on the signing of the general arbitration plan. President Charles L. Eidlitz, of the employers' association, said: "The action of the strikers is a victory for the arbitration agreement. I am more than pleased at the result, and believe that it will be a good building season."

NATIONAL METAL TRADES ASSOCIATION NOTES.

CINCINNATI, April 12.—Commissioner Du Brul left for Washington April 11, to appear before a sub-committee of the labor committee of the House of Representatives relative to the arbitration bill. A special engagement was made for him to appear before this committee on Wednesday, April 12.

Two of the important matters before the administrative council at their next meeting, which will take place either the latter part of this month or early in May, are the relations of local and national employers' associations and constitutional amendments.

W. O. Bates, of the Bates Machine Co., Joliet, Ill., has aroused considerable enthusiasm for the N. M. T. A., thanks to the association's success in handling the strikes of his company which, until the association took hold of affairs, had been drawn out two years.

Latest reports from the Memphis members indicate that the

labor situation at that point has quieted down and the shops are working without annoyance.

The various amendments to the by-laws of the association, which were favorably acted upon at the convention, are being examined by the association's legal adviser, to insure their strict conformity with the statute and their harmony with other points of the constitution and by-laws of the association. Immediately upon the rendering of counsel's opinion, they will be submitted to the members.

The recent flurry among the machinists in the shops of the Geo. B. Sennett Co., Youngstown, O., has subsided.

The Chattanooga members are running their shops full time without being subjected to annoyance from strike promoters.

The Harris Automatic Press Co., of Niles, O., has the distinction of being picketed without molestation.

The labor situation in Cincinnati is in probably better condition than that of any other large city. This is attributed to the operations of the N. M. T. A. and the local employers' associations.

The employers' association of Indianapolis is endeavoring to secure statistics in regard to rates of wages paid machinists. All of the trouble and expense this association is having to secure this information could have been obviated, it is pointed out, by attending the recent Philadelphia convention. Here is one suggestion, at least, on the problem of the relation of national and local associations.

The annual banquet of the Metal Trades Association of the Pacific Coast district of Washington will take place Saturday evening, April 16, at the Hotel Butler, Seattle. The banquet will be of more than ordinary interest owing to the presence of ladies.

The Chicago Brass Manufacturers' Association, spurred on by the splendid success of the members of the National Metal Trades Association, has determined that it will hereafter operate open shops, as advocated by the Anthracite Strike Commission.

Rebate checks are being mailed to the members of the N. M. T. A. holding memberships in local metal trades associations whose secretaries have notified the commissioner that their associations are operating labor bureaus in conformity with the National Metal Trades Association's rules.

CONFERENCE ON SHEET AND TIN PLATE SCALES.

(Special Telegram.)

PITTSBURG, April 13.—At a conference held last night between a committee of the Amalgamated Association, the officials of the American Sheet & Tin Plate Co. and independent sheet and tin plate manufacturers a proposition was made the association which was slightly better than any made heretofore. The manufacturers proposed a settlement on the basis of 17½ percent reduction in both the sheet and tin plate trades. At the session of the special convention of the Amalgamated Association this morning a counter proposition was decided upon, calling for a 15 percent reduction in sheet wages and a 12½ percent on the tin plate scale. The committee of the association is now in session with the manufacturers in the Frick building and the indications are now more favorable to an amicable settlement.

The special convention of the association opened in this city last week and on Thursday, Friday and Saturday officials of the American Sheet & Tin Plate Co. and independent manufacturers attended the sessions and explained why reductions of 20 percent in both trades were necessary. On Saturday evening a conference was held with the manufacturers and it was stated that the delegates would not consent to a reduction of more than 10 percent in both trades. This would leave the sheet scale as reduced on Jan. 1. On Monday night another proposition was made the manufacturers after the refusal of the first, making a reduction of 10 percent in the tin plate scale and 12½ percent in the sheet scale but this was again rejected. At the meeting on Tuesday the delegates decided to formulate another proposition. It is reported that the American Sheet & Tin Plate Co. is already making repairs to some of its smaller idle non-union tin mills so that they will be ready for operation in the event of a strike. The operation of these mills together with its enormous stocks of tin plate will place the company in an excellent position to carry on a protracted strike.

NATIONAL CONFERENCE OF MOLDERS AND FOUNDERS.

The national conference between representatives of the Iron Molders' Union and the National Founders' Association, which had been awaited with much interest in both organizations, opened at the Cadillac Hotel, Detroit, on Thursday, April 7. After a four days' session the conferees adjourned without reaching any agreement on the questions under discussion.

The National Founders' Association was represented by the following: President I. W. Frank, United Engineering & Foundry Co., Pittsburg; Vice President Antonio C. Pessano, Great Lakes Engineering Works, Detroit; W. S. Hallowell, Harrison Safety Boiler Works, Philadelphia; C. Bermingham, Canadian Locomotive Co., Kingston, Ont.; J. L. Ketcham, Brown-Ketcham Iron Works, Indianapolis; H. A. Carpenter, A. Carpenter & Sons, Providence, R. I.; W. D. Sayle, City Foundry Co., Cleveland. The molders were represented by President Joseph F. Valentine; First Vice President Michael J. Keough; Financier R. H. Metcalf; Martin F. Murphy, of Buffalo; Herbert E. Bryant, of Providence; John Murtaugh, of St. Louis; John P. Frey, editor *Iron Molders' Journal*, and James Brown, of Chicago, as substitute. Much of the work of the conference was done by a sub-committee consisting of Messrs. Frank, Pessano and Hallowell, of the foundrymen, and Messrs. Keough, Metcalf and Frey of the molders. The wage scale was not a matter at issue, the questions discussed relating chiefly to shop rules and practices. One of the contentions of the foundrymen was for a proviso in all agreements with the union under which the wage rate would be subject to a differential permitting the employment of a certain percentage of the total number of floor and bench molders who have served a regular apprenticeship at 10 percent less than the established basic wage rate.

The failure to reach an agreement at Detroit will now bring to the front matters pending between the two organizations at Indianapolis, Cleveland, Buffalo and other cities. In the three cities named wage agreements have expired and the two organizations have not been able to get together on new agreements, the negotiations being suspended pending the national conference at Detroit. The existing situation is therefore under no little strain.

LABOR NOTES.

The strike at the Toledo plant of the American Can Co., which had been in progress since March 26, was settled last week. The company employs both union and non-union men.

The employes of the Hamilton furnace of the Hanging Rock Co., Ironton, went on a strike last week because the company had decided to reduce the working force. The furnace is banked and will remain idle indefinitely.

The last of the bitter strike waged for nearly two years by the machinists' union against the Keystone Driller Co., of Beaver Falls, Pa., was disposed of in the Beaver county courts last week when the suit commenced by Arthur H. Neale against E. O. Eyer, of the Keystone Driller Co., for malicious prosecution, was decided in favor of the defendant and the costs placed on the plaintiff. Neale was president of the machinists' union at the time of the strike and was arrested at the instigation of Eyer for alleged interference with the company's employes. Neale was discharged later and commenced the suit for malicious prosecution. The company won its strike and is operating successfully with non-union machinists.

After an idleness of several months the steel plant of the Wheeling Steel & Iron Co., Wheeling, W. Va., resumed operations this week. The company has reached an amicable settlement with its employes who have been on a strike for more than a month. The Belmont blast furnace which has been banked was immediately placed in operation again and the Top Mill furnace which has been relined will be blown in again in a few days.

The strike of members of the Amalgamated Association at the plant of Hoopes & Townsend, Fort Washington, Pa., has been settled and the men have returned to work. The strikers have been reinstated on a basis that is satisfactory to the district board of the Amalgamated Association.

THE BLAST FURNACE SITUATION ON APRIL 1.

The improvement in the iron trade as indicated by the increase in active blast furnace capacity in the first three months of the year has never before been equaled in the history of the iron trade in the United States. While an improvement was expected as a matter of course, following such a sharp falling off as in the months of November and December, the most sanguine did not predict such an awakening as has taken place.

On Jan. 1 only 31 percent of the 166 blast furnaces tributary to the Lake Superior ore region were in blast, the operative capacity having been reduced from 43 percent on December 1 to 69 percent out the first of the year. On April 1, 159 furnaces in this district reporting, 85.5 percent of the entire capacity was operative, showing an increase since the first of the year in the operative capacity of 54.5 percent. On the first of this month 125 stacks were in operation and 34 idle. The official report of J. G. Butler Jr., of Youngstown, O., chairman of the furnacemen's committee, is as follows:

"Reports from 159 furnaces tributary to the Lake Superior ore region have been received, and the result is as follows: Of the total 85½ percent were in blast April 1, and 14½ percent out of blast.

Company.	Aggregate Daily tonnage.	Percent in.	Percent out.
U. S. Steel Corporation	25,887	92	8
Bessemer Pig Iron Assn.	3,644	72	28
Republic Iron & Steel Co. (North)	1,050	100	..
Penna. and Maryland Steel companies and sundry other concerns	16,236	78	22
Total	46,817	85.5	14.5

"The LaBelle Iron Works expect to have a second stack ready for operation by July 1. M. A. Hanna & Co. report five furnaces in blast and one out, with orders in hand, largely foundry and malleable, which will run until after July 1. Reports from furnaces generally are favorable to a continuance of operations during the second quarter of the year."

On April 1 only 8 percent of the entire blast furnace capacity of the United States Steel Corporation was idle. This operative capacity is above normal as an idleness of 10 percent is usually counted on for repairs, etc. On March 1, 79 percent of the Steel Corporation's furnace capacity was in operation. The gain during the month of March was heavy and in keeping with the tremendous gains made during the previous two months. The Bessemer Pig Iron Association furnaces also made a great gain during the month of March—from 58 on March 1 to 72 percent on April 1. This increase in operative capacity was almost entirely due to the large order for Bessemer iron placed by the United States Steel Corporation. The Republic Iron & Steel Co. is operating all its furnaces at the present time, its active capacity having increased from 46 percent on March 1, to 100 percent on April 1. Pennsylvania and Maryland steel companies and other furnaces also show big increase, the operations having increased from 65 to 78 percent during the month of March. The present month of course will not keep pace with the other three months of this year, and it is doubtful if the operative capacity on May 1 will show much of an increase over April 1. Even during the greatest activity in the iron trade rarely more than 90 percent of the furnace capacity is in and the percentage active, as shown on April 1, is very close to the best records established during boom periods. That the situation is assured until the end of the second quarter is now almost a certainty, but little interest has so far been shown by consumers in the third quarter. A compilation of the operations since Dec. 1, of furnaces tributary to the Lake Superior ore region, is given below:

	No. Furnaces.	Daily Capacity Gross Tons.	Capacity in, Tons.	Capacity out, Tons.	Per Cent in.	Per Cent out.	Furnaces in.	Furnaces out.
Dec. 1	156	37,000	15,910	21,090	43	57	65	91
Jan. 1	166	40,524	12,562	27,962	31	69	63	103
Feb. 1	166	40,524	24,957	15,567	61.6	38.4	99	67
March 1	163	45,817	32,957	12,860	72	28	113	53
April 1	159	46,817	40,029	6,788	85.5	14.5	125	34

PITTSBURG AND VALLEY DISTRICTS.

W. Harry Brown has commenced suit at Pittsburg to declare void the merger of the Keystone Car Wheel Co. of that place in the National Car Wheel Co. He alleges that he is owner of 230 shares of stock in the Keystone Car Wheel Co. and that his proxy was secured without his knowledge of the purpose of the meeting at which it was decided to sell the car wheel plant to the National Car Wheel Co. He asks the court to declare the sale of the Keystone plant to the National illegal and void and asks that the two concerns be restrained from selling his stock, as he alleges has been threatened unless he pays an assessment which has been levied by the Keystone company.

The blooming mill of the North Sharon, Pa., plant of the Carnegie Steel Co. resumed operations this week after an extended idleness. The angle mill has not resumed operations, but it is expected that it will be on in full by May 1. No date has yet been fixed for operating the open-hearth plant.

The new mixer installed at the Monongahela steel plant of the National Tube Co., McKeesport, Pa., has been placed in operation. The new furnace which the company is erecting at this plant will be ready for operation about Aug. 1.

The transfer of the properties of the New York & Cleveland Gas Coal Co. to the Pittsburg Coal Co., Pittsburg, was made in the Pittsburg courts last week, the New York & Cleveland company passing out of existence by this transfer. The properties of this company have been owned by the Pittsburg Coal Co. for nearly four years.

The American Sheet & Tin Plate Co., Pittsburg, has decided to put in an additional mill at Monessen, Pa., where it now operates a 24-mill tin plate plant.

The Pittsburg Steel Co., Pittsburg, has purchased 12 acres of land adjoining its property at Monessen, Pa., upon which it is the intention to erect a seamless tube plant.

The 119-inch plate mill of the Carnegie Steel Co., Homestead, Pa., has been shut down, but it is officially denied that it is to be dismantled.

The Powell Coal & Coke Co., of Pittsburg, incorporated in West Virginia with $500,000 capital is offering through the Colonial Trust Co., of Pittsburg, $150,000 worth of bonds, bearing 5 percent interest. The bonds are payable July 1, 1923, at 105 and accrued interest. The company owns 5,738 acres of coal land at Powell Station, on the B. & O. R. R. in West Virginia and 100 coke ovens are under erection which will shortly be placed in operation. The officers of the company are: W. S. Watson, president and treasurer; W. Y. Humphreys, vice president; Roy Wise, secretary, and R. L. Martin, general manager.

The sheet and tin plate mill of the Follansbee Bros. Co., near Wheeling, W. Va., will be placed in operation about Aug. 1. William Banfield, formerly connected with the American Sheet & Tin Plate Co., has assumed charge of the plant and the machinery is now all on the ground and is being installed as rapidly as possible.

The American Bridge Co., at Pittsburg, secured an injunction this week restraining the Pittsburg & Lake Erie railroad from occupying land at McKees Rocks formerly occupied by the Schultz Bridge Co., which was absorbed by the American Bridge Co. About a year ago the plant was destroyed by fire and was never rebuilt. Idleness for more than a year invalidates the lease is the contention of the railroad company, while the bridge company claims that it offered to secure a new concern for the site, but that the railroad company said that it would tear up its side tracks into the property if this was done.

The plant of the Falls Rivet & Machine Co., Cuyahoga Falls, O., was sold April 9 at sheriff's sale for $60,100. The sale of the plant does not affect the operating company, but was made to satisfy a judgment in favor of the Cleveland Trust Co. The appraisement was $90,000.

The Empire Steel & Iron Co., Catasauqua, Pa., reports for the year ended Dec. 31 a profit and loss balance of $165,443, against $128,639 the year before. Its net earnings, after depreciation charges, were $308,651, against $203,087. The 3 percent preferred dividend required $75,000, and $196,846 was spent or set aside for improvements or extraordinary depreciation.

PHILADELPHIA FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club in Philadelphia, on Wednesday, April 6, the president, Thomas Devlin, occupying the chair. The following were among those present:

Dr. E. E. Brown, E. E. Brown & Co.
Thos. Devlin, Thos. Devlin Mfg. Co.
Lyman P. Clark, Edw. E. Pennewill and W. A. Perrine, Abraham Cox Stove Co.
Chas. D. Orr, Thomas, Roberts, Stevenson Co.
John Fleming, S. J. Criswell Iron Works.
C. D. Matthews, Camden Iron Works, Camden, N. J.
John K. Still, Standard Scale & Supply Co.
P. J. Potter, E. J. Etting Co.
E. J. Decker, Paul S. Reeves & Son.
J. H. Fries, Howe Scale Co.
W. T. McDonald, Schaum & Uhlinger.
J. J. McCrystal, Girard Iron Works.
Prof. W. Campbell, Columbia University, New York.
J. Thompson, J. Thompson & Co.
A. A. Miller, *Iron Age*.
W. O. Steel, Bateman Mfg. Co., Grenloch, N. J.
C. R. Brown and A. D. Wallace, E. E. Brown & Co.
Walter S. Bickley, Penn Steel Casting & Mach. Co., Chester, Pa.
J. S. Robeson, American Glutrose Co., Camden, N. J.
A. Simonson, Wm. Wharton Jr. & Co.
W. H. Ridgway, Craig, Ridgway & Son Co., Coatesville, Pa.
H. O. Evans, Thos. Devlin Mfg. Co.
Geo. C. Davis, Chemist.
J. Hy. Pepper, *The Iron Trade Review*.
J. H. Sheeler and F. E. Hemsher, Sheeler-Hemsher Co.
Thos. J. Kelley, Thomas, Roberts, Stevenson Co.
H. L. Tripple and W. W. Phillips, Fairbanks Co.
C. Gorman, Schaum & Uhlinger.
Chas. F. Link, Thos. Devlin Mfg. Co.
Frank T. Wright, U. S. Cast Iron Pipe & Foundry Co. Burlington, N. J.
Howard Evans, J. W. Paxson Co.

The treasurer, Josiah Thompson, reported a balance in the treasury of $2,150 and all bills paid. At the invitation of the chair E. E. Brown, the association's representative on the committee having executive charge of the St. Louis Exposition foundry exhibit project, detailed the work done by the committee so far, and stated that a member of the committee was now in St. Louis to confer with the exposition authorities. On his return to New York the committee would have another meeting and make a final decision, which would be made public, whether the proposed exhibit would be made or not. One thing was certain, he said; the committee would not undertake the carrying out of the plans formed unless the exhibit could be made entirely creditable to the foundry trade generally.

A communication was read from the secretary of the Philadelphia committee, having in charge the entertainment of the members of the Iron and Steel Institute when they visit Philadelphia next fall, asking the support of the association. The communication was ordered to be filed.

Another communication was read from Dr. Moldenke, secretary of the American Foundrymen's Association, inviting local foundrymen to attend the convention of that association to be held in Indianapolis June 7, 8 and 9 and in St. Louis June 10.

The lecturer of the evening was Prof. Wm. Campbell, of Columbia University, New York, his subject being "The Microscopical Examination of Alloys." The lecture, which was profoundly interesting, was illustrated by 50 lantern slides.

There was little or no discussion on the subject at the conclusion of the lecture. Asked whether the conditions he had illustrated by means of plotted curves represented definite relations of the constituents, Prof. Campbell said: "They always have the same position. The best example, perhaps, is to be found in common solder, 2 parts tin and 1 part lead. If you take these metals half and half you have an excess of lead, and as that cools down you get crystals of lead. The part of the mother liquors is to crystalize out. You can see the reason why a plumber can take a good solder, 2 to 1, and wipe a joint clear and white, but if he takes a half and half alloy it is apt to produce a dirty white."

Mr. Davis requested that Prof. Campbell favor the meeting with a little history of the work in metallography which he had demonstrated and present an idea of the vast amount represented in the research described. The process employed, Mr. Davis said, was somewhat expensive and was calculated to make an ordinary chemical look very small. The slides shown, he added, represented only an infinitesimal part of an inch in surface of metal.

Prof. Campbell, in reply, said that chemistry would determine what metals an alloy was composed of, and metallography would show how they exist. Metallography, he said, was a most interesting study, and within the scope of almost anyone. The action of an alloy in heating and cooling was highly important as bearing upon the resulting structure, and in consequence metallography as a study was being widely taken up. A most valuable auxiliary to the study was the microscope, and this, with a desire to make research, was mainly all that was required. He mentioned many cases of men in different parts of the world who, with very little knowledge of chemistry, had made some useful discoveries of the properties of metals through metallography. Concluding he gave a brief history of the new science of metallography and the connection of many eminent scientists with researches on record.

A vote of thanks was presented to the professor for his presentation of the subject.

The question of closer relations with sister associations was then taken up, and considerable discussion evolved. Finally, on motion of Dr. Brown, it was resolved to suspend the order of business at the next meeting and hold a dinner, to which invitations would be extended to the New England and Pittsburg associations.

American Car & Foundry Co.

The earnings of the American Car & Foundry Co. for the quarter ending with March show a decrease of $893,695, or 62½ percent as compared with the same period in 1903. The company is paying 1¾ percent on the preferred quarterly, requiring $525,000, and ½ percent on the common, requiring $150,000, making a total of $675,000. The earnings were $532,423; therefore it will be necessary to draw upon surplus for $142,177 to pay the quarterly dividends. The comparison follows:

	1904.	1903.	Decrease.
Net	$532,423	$1,426,108	$893,685
Dividend preferred	525,000	525,000	.....
Balance	7,423	901,108	893,685
Dividend common	150,000	300,000	150,000
Deficit	142,577	*601,108	743,685
From May 1 to Feb. 29:			
Net	4,172,745	5,900,979	1,728,226
Dividend preferred	1,575,000	1,575,000	.....
Balance	2,597,745	4,325,979	1,728,226
Dividend common	750,000	900,000	150,000
Surplus	1,847,745	3,425,979	1,578,226
Total surplus	11,903,200	.....	.....

*Surplus.

Rarig Engineering Co. Reorganized.

A. K. Rarig has retired from the presidency of the Rarig Engineering Co., Columbus, O. Mr. Rarig still retains a large interest in the concern. The company now has the following officers: President, C. E. Morris; vice president, W. T. Guy; secretary and treasurer, E. F. Fassig, and general superintendent, A. A. Brown. The new officers have decided on an issue of $400,000 new stock, $350,000 preferred and $50,000 common. This will be in addition to $200,000 original stock. The new capital is to be used in carrying on and extending the business of the company. The company is now finishing a portion of a gun carriage contract for the government, which represents an outlay of about $200,000, before the government makes its final payment. The first shipment of the contract for 20 gun carriages is to be made May 1. Another large contract of this company, that of furnishing blowing engines and other equipment for the Dominion Iron & Steel Co., Sydney, Nova Scotia, is nearly finished.

The Montreal Locomotive & Machine Co. has formally passed into the control of the American Locomotive Co. The following directors have assumed control: S. R. Callaway, New York, chairman; J. Reid Wilson, Montreal, vice president; M. G. Haney and Roger Miller.

The Friedland & Morison Iron & Metal Co. has been organized at Lansing, Mich., and will deal in scrap.

BRITISH PIG IRON AND STEEL OUTPUT IN 1903.

Statistics have been gathered by the British Iron Trade Association showing the production of pig iron and Bessemer and open-hearth steel in 1903. The total production of pig iron was 8,811,204 tons against 8,517,693 tons in 1902, 7,851,830 tons in 1901 and 8,908,570 tons in 1900. The distribution among the various descriptions of pig iron was as follows for the past three years:

	1901 Tons.	1902 Tons.	1903 Tons.
Forge and foundry....	3,597,992	3,860,494	3,875,826
Hematite	3,177,684	3,648,948	3,760,422
Basic	794,789	892,218	991,610
Spiegel, etc.	191,365	185,033	183,346
Totals	7,761,830	8,586,693	8,811,204

The stocks of pig iron in public stores at the end of 1903 were 241,311 tons, against 234,614 tons at the end of 1902; 290,718 at the end of 1901; 219,553 at the end of 1900; 559,793 at the end of 1899 and 754,766 at the end of 1898. The statistics indicate the decline of the warrant system in Great Britain.

Bessemer and Open-Hearth Steel.

The total output of Bessemer steel ingots in the United Kingdom in the year 1903 was 1,910,018 tons, against 1,825,779 tons in 1902, 1,606,253 tons in 1901, 1,745,004 tons in 1900, and 1,825,074 tons in 1899. The production of acid Bessemer ingots was 1,316,915 tons in 1903 and of basic Bessemer ingots, 593,103.

The production of Bessemer steel rails in the United Kingdom in 1903 was 1,061,441 tons, against 903,216 tons in 1902, 732,260 tons in 1901 and 759,844 tons in 1900.

The total production of open-hearth steel ingots in the United Kingdom in 1903 was 3,124,083 tons, against 3,083,288 tons in 1902, 3,156,050 tons in 1900, and 3,030,251 tons in 1899. The output in 1903 was 40,795 tons more than that of 1902.

In the following table are presented details of the British make of open-hearth and Bessemer steel ingots for each of the last eight years:

Year.	Open-hearth. Tons.	Bessemer. Tons.	Total. Tons.
1896	2,317,555	1,815,842	4,133,397
1897	2,601,806	1,884,155	4,485,961
1898	2,806,600	1,759,386	4,565,986
1899	3,030,251	1,825,074	4,855,325
1900	3,156,050	1,745,004	4,901,054
1901	3,297,791	1,606,253	4,904,044
1902	3,103,288	1,745,779	4,849,067
1903	3,124,083	1,910,018	5,034,101

The returns of finished and semi-finished steel produced by the two processes are given in the table below:

	Open-hearth. Tons.	Bessemer. Tons.	Total. Tons.
Plates and angles.....	1,248,079	21,840	1,269,919
Rails	84,942	1,061,441	1,146,383
Bars	537,745	221,283	759,028
Blooms and billets....	400,664	239,119	639,783
General merchant steel	169,394	125,444	294,838
Totals	2,440,824	1,669,127	4,109,951

The production of Bessemer steel in Great Britain has been partially stationary for the past 20 years. In open-hearth steel there was an increase of 838,495 tons in the five years ending with 1900, the latter year showing 3,156,050 tons and the former 2,317,555 tons. In 1901 high mark was reached at 3,297,791 tons, and 1903 shows a falling off of 32,000 tons from 1900.

The dissensions which had harassed the Compressed Air Co. for about a year and had prevented the company receiving the financial support which it needed, have been compromised, and all the interests in the company agree that a reorganization is necessary and that the company must be furnished with new working capital. At a meeting of the stockholders held in New York, April 7, a majority of the stock was voted for a ticket agreeable to all. The new board consists of Henry Monkhouse, A. C. Soper, C. S. Truax, R. M. Dixon, Edward Comstock, Thomas S. Stryker, Thomas B. Kent, Charles H. Duell, A. B. Proal, H. L. Langhaar, F. W. Huidekoper, D. C. Moorehead, Charles C. Allen, Thomas Clark, Jr., and D. W. Patterson. The terms of the reorganization will be decided upon by a committee of the new board, acting with the committee of bond holders recently appointed. It was agreed that the meeting of some of the stockholders held March 8 be declared void.

Associated Foundry Foremen.

The New York branch of the Associated Foundry Foremen held its third monthly meeting on Saturday evening, March 26, at Hotel Montgomery, Jersey City, N. J. Chas. H. Thomas, of Newark, N. J., head of the national organization, presided A. M. Loudon read a paper on the "Metallurgy of Cast Iron." A suggestion of the speaker was that each of the metalloids be taken up for study, one at each of the subsequent meetings. W. S. Sutherland, of the J. L. Mott Iron Works, read a paper on "Experimenting with Samples." He thought too little attention was paid to samples sent to foundries for advertising purposes. Often the foreman might thus become acquainted with a material as serviceable as that he had been in the habit of using, and perhaps considerably less expensive. President Thomas presented a paper dealing generally with the work of the foundry foreman, the problems he encounters, the management of men and the advantageous handling of work. All the papers of the evening were well received and the discussion was entered into with enthusiasm.

The following were in attendance: C. MacDonald, Snead & Co. Iron Works, Jersey City; N. R. Marvin, A. A. Griffing Iron Co., Jersey City; Chas. H. Thomas, D. C. Wilson and L. H. Roe, Newark, N. J.; John Leechman, Jersey City; W. S. Sutherland and J. W. Du Bois, New York; Walter Hoffman, Union Hill, N. J.; Gustav Ryan, Hoboken, N. J.; John Phillips, John Latham, A. F. Neil and Harry Flockhart, Newark, N. J.; J. J. Rooney, Elizabeth, N. J.; Hugh McPhee, Bridgeport, Conn.; W. McWilliams, So. Norwalk, Conn.; S. W. Williams, Elizabethport, N. J.; T. A. Angell, C. G. Howe and Edem Campbell, Jersey City; A. M. Loudon, Portchester, N. Y.; Andrew Hunter, Cold Springs, N. Y.; Chas. Stuart, Hoboken, N. J.; Mr. Gearney, Brooklyn, N. Y.; A. W. Brown, Portchester, N. Y.; Jas. Spense, Kearney, N. J.; F. C. Everitt, secretary, New York.

Rail Production at Edgar Thomson Since 1875.

The *Bulletin* of the American Iron and Steel Association gives the following interesting statement of Bessemer steel rail production at the Edgar Thomson steel works in the past 29 years, which it pronounces the most remarkable metallurgical record that has been printed. The building of the Edgar Thomson steel works was undertaken in 1873, but the works were not completed until 1875. When built they embraced two 5-ton Bessemer converters and a rail mill. The first blow was made on Aug. 26, 1875, and the first steel rail was rolled on Sept. 1, 1875. The Edgar Thomson plant was enlarged at an early day in its history and it has since been frequently enlarged. Its equipment today includes four 15-ton converters:

Years—Gross tons.	Production.	Years—Gross tons.	Production.
1875.....	5,853	1890.....	332,942
1876.....	32,226	1891.....	264,469
1877.....	48,826	1892.....	330,511
1878.....	64,505	1893.....	230,336
1879.....	76,044	1894.....	220,337
1880.....	100,095	1895.....	324,778
1881.....	151,507	1896.....	300,776
1882.....	143,561	1897.....	477,363
1883.....	154,892	1898.....	561,757
1884.....	144,090	1899.....	604,343
1885.....	126,656	1900.....	626,831
1886.....	173,001	1901.....	708,113
1887.....	192,999	1902.....	709,906
1888.....	148,293	1903.....	675,214
1889.....	277,401	Total.....	8,207,625

The American Pig Iron Storage Warrant Co. had 64,100 tons of pig iron on hand Feb. 29 and received 10,400 tons in March. The deliveries were 4,800 tons in March, leaving stocks on hand March 31 of 69,700 tons.

The Milwaukee Tack Co., Milwaukee, Wis., which was forced into involuntary bankruptcy, has filed a statement placing its liabilities at $23,714.96 and its assets at $23,094.

STOCK DISTRIBUTION IN BLAST FURNACES.*

BY DAVID BAKER.

When the skip hoist was first tried as a means of filling the blast furnace it made a great many enemies and very few friends among furnace managers. This state of affairs continued until the Duquesne furnaces were built, which demonstrated not only the possibilities of a furnace stack in the way of production, but also the ability of the skip hoist to charge the materials necessary to produce the large tonnage obtained. Every furnace manager, who has operated stacks fitted with the vertical hoist and the hand-barrow system of filling, remembers that the momentous question about the furnace, particularly during a good run, was: "Are you keeping her full?" and many a good run has been spoiled by the furnace "getting away from the men."

With the new birth of the skip hoist this trouble was eliminated, but alas! other and more important difficulties arose. The distribution of the stock, the importance of which is never learned until many different ores and fuels have been tried, demanded closer attention. With all the defects of the hand barrow system, the distribution—when the top fillers were conscientious in carrying out the filling scheme arranged after thoughtful consideration by the manager—was above criticism. It is said that the modern skip hoist, equipped with an elliptical hopper and receiving cylinder, and discharging over a small bell into the main hopper, will give just as good results as those obtained with hand barrow charging, but I

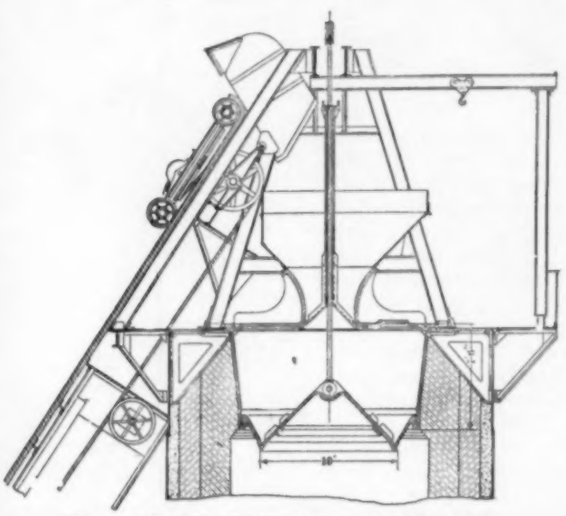

FIG. 1.—TOP OF FURNACE NO. 1. FIRST CAMPAIGN.

cannot agree with this statement. I grant that, under very favorable conditions, the mechanical furnace top will do apparently as well as the hand system of charging, but under unfavorable conditions it fails. It is the unfavorable case that is all important, for that frequently means the success or failure of the business concerned.

I am now speaking from my own experience. Possibly there is in the market today a mechanical top charger that will give as good distribution as that obtained by the hand barrow system, but the low fuel consumption obtained by the furnaces equipped with the old system has never, to my knowledge, been equaled by those with the new. Can any one point to such a record by a new plant as that reached by Furnace No. 6 of the Illinois Steel Co., which showed for a year a fuel consumption of 1,581 pounds of coke per ton of pig iron produced?

I believe the reason for this lies in the great abuse to which coke is subjected in these new plants. I refer to the great number of times the coke is required to drop from one receptacle to another, grinding much of it into dust and breaking the balance into pieces much smaller than those of the original coke freshly drawn from the oven. It is quite common at such plants for the coke to be forked into hopper cars at the ovens, dropped from these into a deep steel bin at the furnace, drawn into the larry car, dumped into the skip, thence into the top receiving hopper, from which it drops on to the main bell, and is finally discharged into the furnace. Other modern plants avoid one dump by chuting the coke direct from the bins to the skip cars. On the face of it this seems to avoid one handling and to save a great deal of breakage, but usually these bins are so much deeper than those in connection with the larry that the breakage is nearly as great.

By this mechanical system the coke is dropped from six to seven times as compared with three or four times by the hand barrow system, and one of these (from the barrow into the furnace hopper) can hardly be called a drop, the breakage resulting therefrom being so slight.

Many of my readers have seen what, ten years ago, might have been called a modern plant, equipped with hand bar-

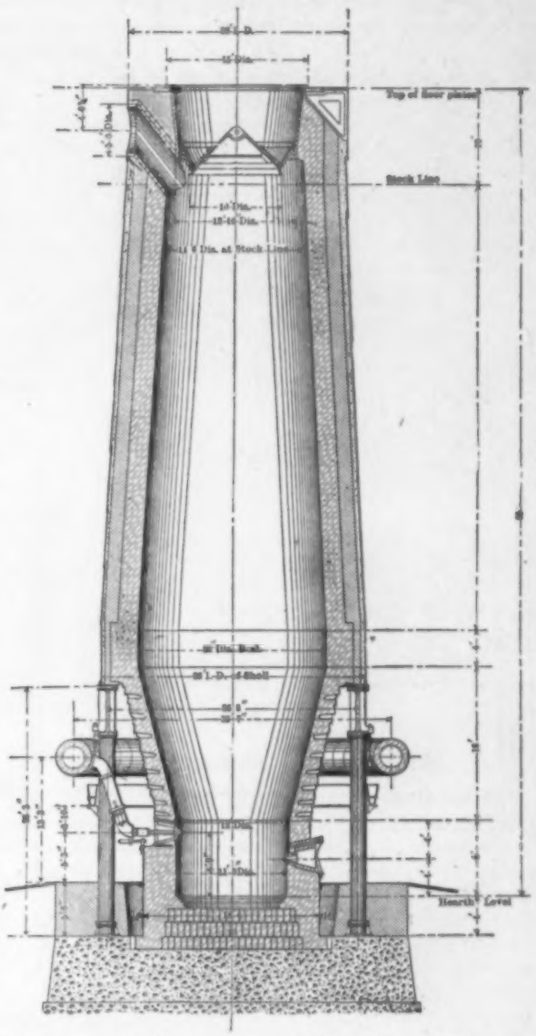

FIG. 2.—SECTIONAL VIEW OF FURNACE NO. 1. FIRST LINING.

rows which take the coke direct from box cars into barrows; in this system the coke receives practically only one drop that is likely to cause any breakage, i. e., when it is discharged from the bell into the furnace. This careful handling of the coke is of the utmost importance, and when the coke is of a soft or friable nature, it may mean the difference between the success and the failure of the blast furnace operation.

The baleful results of the breakage by the repeated handlings of coke in the modern furnace plant equipped with the usual mechanical charger, as well as the necessity of obtaining good distribution of the stock, were demonstrated very clearly at the plant of the Dominion Iron & Steel Co., at Sydney, Nova Scotia. The coke, made in the Otto-Hoffman by-product ovens about 1.5 miles from the furnace plant, is delivered to the furnaces in hopper cars each of 20 tons capacity, and is dumped from them into large coke bins at the

*Read at the Atlantic City meeting (February, 1904) of the American Institute of Mining Engineers. Mr. Baker, until recently with the Dominion Iron & Steel Co., Sydney, Cape Breton, is now a consulting engineer at Philadelphia.

foot of the skip hoist; thence it is drawn direct into the skip bucket.

The hoist is a double skip arrangement, and the top charging device, shown in Fig. 1, consists of a circular hopper, having the discharge controlled by a small bell. The coke used at this plant is made from the Dominion Coal Co.'s coal, and is very friable and quite soft.

The first furnace was blown in on Feb. 4, 1901, very successfully, and everything worked smoothly for a few weeks; but at the end of this period the furnace began to hang and slip and burn tuyeres, sometimes cutting at a slip every tuyere in the furnace. The tuyeres failed in nearly every case on the lower side of the nose, showing that they must have been flooded by cinder and iron when the slip occurred. The destruction was so rapid that, in some cases, the tuyeres exploded, blowing down the "blow pipes" and the "pen stocks," causing a panic among the furnace men and not adding to the comfort of the furnace manager.

An analysis of the flue dirt gave the following results, which show that most of it was coke: Loss on ignition, 52.87; SiO_2, 8.60; Fe_2O_3, 16.35; Al_2O_3, 6.56; CaO, 5.51; and MgO, 3.46 percent. The coke in the bins was very dirty and badly broken, and it was apparent that the coke in the hearth of the furnace was so finely divided that the slag found great difficulty in settling through the mass, particularly during a slip; hence, the flooding of the tuyeres with cinder and iron, and their consequent destruction. In fact, it was only after long blowing at the cinder notch and repeated checkings of the blast that the tuyeres could be dried sufficiently to take off the blast without filling the blow pipes.

The first effort made to reduce the tuyere destruction was the increase of the feed water pressure by changing from the regular tank service of salt water at 20 lb. to the fresh water main at 40 lb. per sq. in. This made only a slight improvement. Next was the steady increase of the number of engine revolutions, until an average volume of 36,000 cu. ft. per minute, measured by piston displacement, was forced through the tuyeres. After this change the slipping was less frequent, the output greater and, at the same time, no more tuyeres were lost. Finally, silica rock was introduced in the charge, which had a marked effect, making the slag very fluid, reducing the burning out of the tuyeres materially and increasing the output greatly. The best results were obtained by the addition of 200 lb. of quartz gravel for each ton of ore charged, changing the slag analysis from 31.54 to 34.32 SiO_2, and from 15.2 to 12.76 percent Al_2O_3. At that time dolomite was used as a flux.

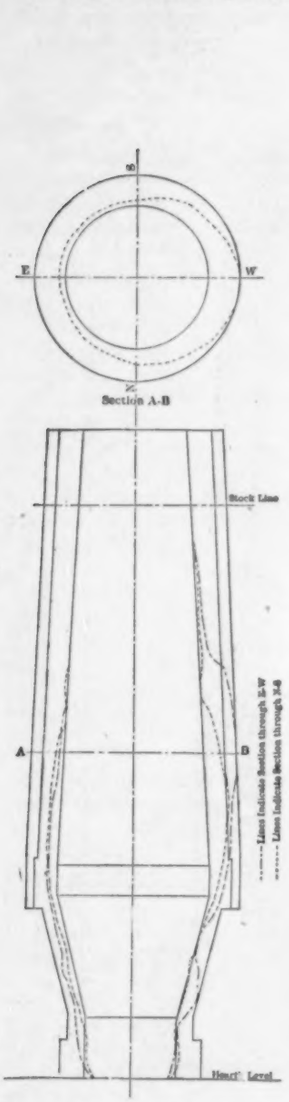

FIG. 3.—BURNED LINES OF FURNACE. FIRST LINING.

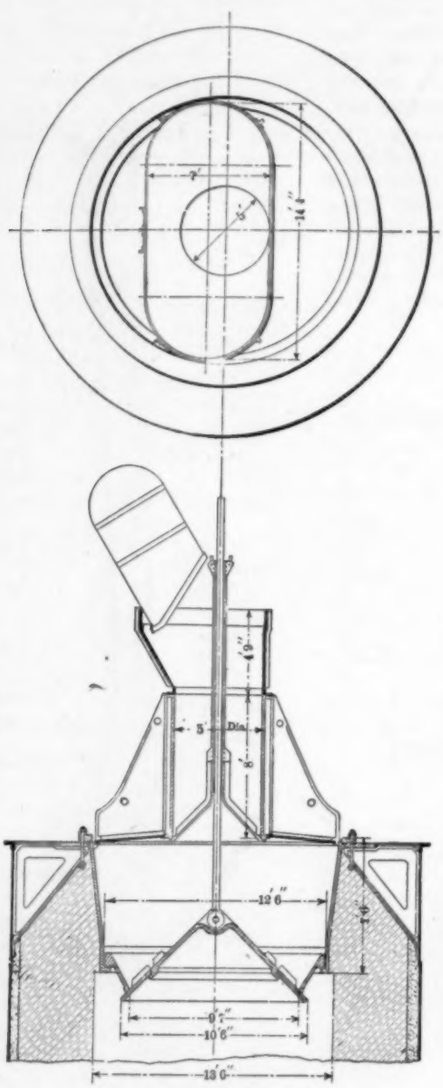

FIG. 5.—TOP OF FURNACE NO. 2. SECOND CAMPAIGN.

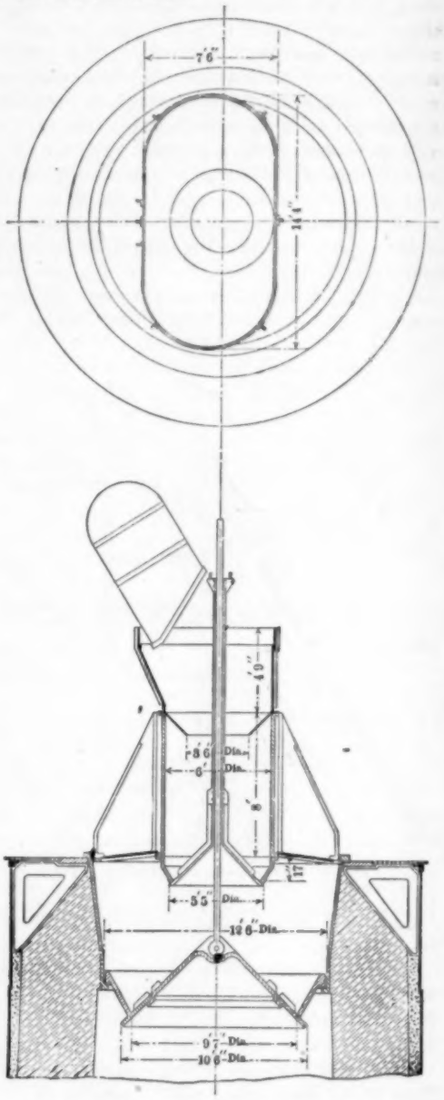

FIG. 6.—TOP OF FURNACE NO. 6. SECOND CAMPAIGN.

The ore obtained from Wabana, Bell Island, Conception Bay, Newfoundland, is a uniform, dense, red hematite, which has been split up *in situ* by cleavage planes into lumps of rhomboid shape, having a similar appearance to broken red brick. The ore is practially free from fines and is of the following average analysis: Fe, 51.43; SiO_2, 14.03; Al_2O_3, 4.57; MgO, 0.52; CaO, 2.23; Mn, 0.15; P, 0.805; S, 0.038; and TiO_2, 0.45 percent. The high percentage of alumina in the ore seems to render the slag viscous, and is only corrected by the addition of silica, the best results being obtained when the slag does not exceed 13 percent alumina. Probably the titanic acid also adds considerably to the infusibility.

Notwithstanding all the changes noted above, which lessened the destruction of the tuyeres, there was still room for much improvement. Screens were placed in the chutes

from the coke bins to the skip buckets, which eliminated 4 percent of fine coke braize.

These changes had hardly been accomplished when the shell of the first furnace began to show an unusual temperature about 20 feet from the top of the bosh and opposite to the skip way. The furnace had been in blast only six months and the bricks, made by Harbison & Walker, of Pittsburg, were held responsible for this rapid failing of the lining. It was stated by those present when these linings arrived that the bricks had not been properly housed, and had been subjected to freezing after being wet. Fig 2 shows the first lining, in which the bricks used in backing up the in-wall were of second quality Scotch make. The burned lines of this furnace, Fig. 3, show that the failure of the in-wall was confined to the side opposite the skip way. The second furnace started, No. 2, five months after the blow-in, developed the same weakness in identically the same place. From the first I doubted that the bricks were wholly responsible for these failures; and when the third furnace, after a most favorable start, with all the conditions normal, developed a hot spot within three weeks after blow-in, and cut through nearly 5 ft. of firebrick in exactly the same location, I was convinced that the true cause of the trouble should be sought in another quarter. The conditions of the coke charged and the distribution of the charge had been carefully studied for some time, and it became evident that they had some connection with the irregular wear of the furnace in-walls.

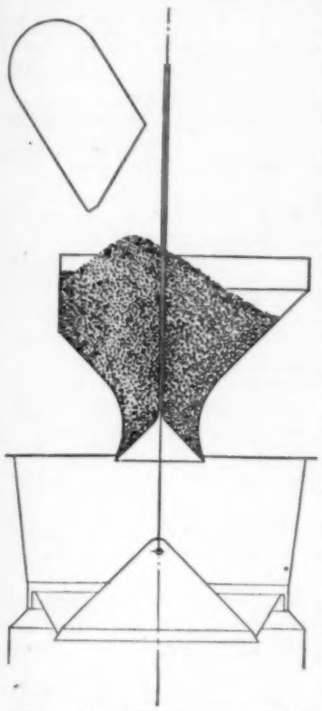

FIG. 4.—DISTRIBUTION OF ORE IN STOCK-CHUTE OF FURNACE NO. 1 DURING THE FIRST CAMPAIGN.

When the first lining failed, a model furnace was prepared with a complete top-charging arrangement, the shell being of glass strips fastened to narrow wooden strips, so that the descent of the charges could be observed. The material was drawn from the bottom so as to lower the stock in the same way as the blast furnace charge is moved by the combustion of the coke in the hearth. At the same time a careful study was made of the actual filling at the furnace in operation.

The result of this observation showed that the furnace hopper was filled in the manner illustrated in Fig. 4; the finer portion of the charge remained under the dumping point of the skip, while the coarser portion of each material rolled to the other and the same side of the furnace where the lining had failed in every case.

The furnace, therefore, had on one side the best coke and all lump ore and flux, while on the other side was the coke dirt and fine coke with the finer portion of the ore and flux, which latter material had been crushed at the quarry to pass through a 4-inch ring. As a result of this condition the furnace worked faster and hotter on the side having the most lumps; in fact, it was "channeling" in that direction. Had the charge been of regular Lake Superior ore, with about 10 percent lump material, and Connellsville coke, probably no such separation would have been noticed, for there would have been enough fine ore to have made the charge practically of the same penetrability to the upward moving gases, and very much less breakage of fuel, so that in efficiency the whole charge would have been more nearly the same.

In order to correct these defects of distribution, a top for Furnace No. 2 was designed, as shown in Fig. 5. In this new furnace top an elliptical hopper replaced the old circular one, the idea being to prevent the sizing of the material by discharging this elliptical hopper into a cylinder closed by a bell. The head frames of the top were so low that the cylinder could not be made as long as was desired, and it did not have quite the capacity of two full skips. Four months after the "blow-in" this furnace developed a hot spot, on the side opposite from the others, which apparently showed that the sizing had been reversed, but not corrected.

The second attempt to correct the distribution without entirely removing the head frames and changing the angle of the skip way is shown in Fig. 6. In order to make room in the cylinder for two full shiploads of coke, the diameter was increased to 6 ft., and the lower part of the elliptical hopper was extended into the cylinder, thus narrowing the opening to 3.5 ft., so as to throw all of the material to the center of this cylinder and in the sizing, which must inevitably take place, to leave the fines in the center and the lumps next to the shell of the cylinder. This furnace has now been in blast eighteen months and has not shown any unusual heating in the shell.

The breakage of the coke continues and cannot be remedied with such a filling system, but enough has been done to show that with well coked, washed coal a fairly uniform furnace practice can be maintained with only the normal destruction of tuyeres. Unquestionably, the excessive breakage of the fuel very materially lowers its practical calorific efficiency in the blast furnace. This efficiency is in inverse proportion to the breakage, for, other conditions being equal, the amount of carbon absorbed by the hot CO_2 of the gases is in proportion to the surface exposed. This means that, other things being equal, the fuel consumption in a blast furnace per ton of pig iron produced is directly proportional to the breakage the coke receives between the oven and the hearth of the furnace. Therefore, in laying out new works it is of the utmost importance to have the blast furnaces and coke ovens studied together from this standpoint, in order to put the coke into the furnaces with the minimum amount of handling. This amount may be reduced with the right design to only two drops.

In recapitulation, this experience demonstrates that greater care is needed to distribute well an ore that is all lumps, particularly when smelted with soft coke that is subjected to the abuse of the repeated handlings incident to the modern filling and charging device. Whether the labor saved by such filling arrangements compensates for the loss due to impaired efficiency of the fuel resulting from such abuse, is a question left for others to solve.

Largest Fresh Water Steamer Launched.

The Augustus B. Wolvin, the largest steamer ever built for fresh water, was successfully launched at Lorain, O., April 9. The ship was built at the Lorain yards of the American Shipbuilding Co. Its length over all is 560 feet and it will carry 11,000 tons of ore on 18 feet draught. Its total cost will be $480,000. Charles M. Schwab was one of the guests of honor at the launching, and in an address expressed regret that when he went into the shipbuilding business he did not become connected with lake interests instead of with those on the seaboard.

About 100 men are at work preparing the Pencoyd Iron Works to resume operations. It is expected that by April 16 six of the eleven regenerative gas heating furnaces will be in operation, and two of the blooming mills, part of the steel mill and the 28-inch mill will be at work. It is expected that on April 25 the two 23-inch mills will be ready to start. The bridge shops, the only department which has remained in operation, will be operated on full time within a few days.

At a meeting of the directors of the American Steel Foundries held in New York, April 7, Joseph E. Schwab tendered his resignation as president, to take effect April 16. The resignation was accepted and General Charles Miller was appointed president. Mr. Schwab is still a member of the executive committee and board of directors. The directors declared the regular quarterly dividend of 1½ percent on preferred stock.

NEW BOOKS.

"The Metallurgy of Steel," by F. W. Harbord, with a section on the mechanical treatment of steel by J. W. Hall. This portly volume, 2½ inches thick, and containing 758 6 x 9-inch pages, is in the metallurgical series projected by Prof. Roberts-Austen and follows Prof. Turner's companion treatise on the "Metallurgy of Iron." There is indeed a curious coincidence here. Mr. Harbord was unable in the first place to undertake the work of preparing a volume devoted to iron and steel and the task which devolved upon Prof. Turner resulted in his book as the first installment of a work which it was found inadvisable after all to confine to a single volume. Prof. Turner being similarly prevented from writing the volume on steel, Mr. Harbord took his place in turn and the notes and manuscript already prepared by the author of the "Metallurgy of Iron" reverted to the writer of the present book. The plan decided upon for the later work did not fit closely with that contemplated by Prof. Turner and the data were necessarily preferable for reference than for direct insertion as written. The book is divided into sections. The first section deals with the theory and practice of steel manufacture, with many typical examples of modern furnaces, gas producers, etc. This section has chapters on the Bessemer process (53 pages); the basic process; manufacture of steel in small converters; chemistry of the acid Bessemer process; chemistry of the basic Bessemer process; gas producers (28 pages); the open-hearth process (38 pages); basic Siemens process (36 pages); the production of steel castings; the production of shear and crucible steel; armor plate manufacture and direct processes of steel manufacture. The second section has chapters on reheating furnaces and methods of handling material at the reheating furnaces. The third section discusses the development of the rolling mill; rolling mill construction and the five types; roll making; special mills; rolling mill engines; handling material at the rolls; the use and output of section, plate and sheet mills; rod mills; continuous mills; handling material in the stock yard; laying out of the mill; forging by steam hammer and by press; fluid steel compression; tube making; wire drawing; the protection of steel from corrosion. This section concludes with on account of some modern English steel plants. The fourth chapter deals with finished steel; mechanical testing; the combination of carbon and iron; the influence of certain elements on the physical properties of steel; steel alloys; heat treatment; microscopic examination of steel.

The first section and the fourth were prepared by Mr. Harbord, the second was entrusted to Mr. Hall and the third bears both names. Many of the engravings have been made from drawings to scale and there is a drafting room semblance to all the line drawings which will give confidence in the illustrated designs. Many of the engravings fail to equal the merits of the text nevertheless. This does not apply to the numerous micro-photographs which are reproduced excellently on special paper and depict micro-structures vividly. The author not only frankly acknowledges his debt to others in his preface and his frequent footnotes, but gives bibliographical references freely at the close of a number of chapters. The magnitude of the work presumably accounts for the omission of quite recent investigation. The experiments of Ruthenburg and others in electric melting furnaces has neither place nor mention so far as we can find. The mechanical engineering sections are fully up to the standard of the metallurgical exposition and much useful matter is offered the reader.

The manufacture of tubes has received no extensive treatment prior to the article on welded pipe by Victor Beutner, in *The Iron Trade Review* of Dec. 17 and 24, 1903. The author does not give so comprehensive a discussion as Mr. Beutner presented, but in view of prior conditions this is probably not surprising. Altogether it is a remarkable book, with a wealth of data consistently classified for reference and carrying the metallurgy of steel through to the specifications of American and British standards (both given in the appendix). The publisher, the J. B. Lippincott Co., of Philadelphia, has given the textbook fitting typographical dress, good paper and substantial cloth binding. Price $9.

The Southwark Foundry & Machine Co., Philadelphia, has taken a contract for two large blowing engines to be installed in the Middlesboro, Eng., works of Bolckow, Vaughan & Co.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The extensive improvements contemplated by the Phœnix Cement Co., of Nazareth, Pa., have been laid out by Dodge & Day, modernizing and contracting engineers, Nicetown, Philadelphia, and it is thought the work will be started in the near future. Most of the buildings will be enlarged, electric transmission installed throughout and the entire plant thoroughly modernized in order to increase materially the output to keep pace with the growing demand for the product. This will necessitate the installation of considerable additional power equipment, as well as a 200-kilowatt generator, tandem compound engine for generator, one 50 and one 75 horsepower motor and a number of smaller motors; charging cars, turntable, coal and ashes conveyor, underfeed stokers, steam locomotive for hauling cars to and from the quarries; electric hoist, electric air compressor, blower and exhauster, air cooled conveyor, belt conveyors, elevators, automatic weighing machine, extension of track system, etc.

The Lake Erie Nail & Supply Co., Cleveland, has been incorporated with a capital of $15,000. The incorporators are: W. G. Aborn, C. J. Robinson, J. L. Findlay, W. A. Coy and R. F. Trumper.

The Bounds Wire Fence Co., Columbus, O., has been incorporated with a capital of $25,000. The incorporators are: Perry M. Bounds, Frank McCafferty, M. B. Schley, Carl Lewis and F. L. Hogsham.

F. A. Clegg & Co., organized at Louisville, Ky., to manufacture steam heaters and ventilators, have been granted a charter. Capital stock is $25,000. The incorporators are: F. A. Clegg, Henry Weilage, George Mathews and Otto Krause.

Floyd, Wells & Co., Roylesford, Pa., have been incorporated with a capital of $210,000 to manufacture stoves and ranges. The incorporators are: Isaac Brookes, C. W. Wagoner, I. Irwin Wells, William J. Wagoner and George Wagoner.

The Davenport Washing Machine Co., Davenport, Ia., has been incorporated with a capital of $10,000. The officers of the company are: President, Julius Krabbenhoeft; vice president, Henry E. Carstens; secretary and treasurer, Gustav Krabbenhoeft.

The Davison Foundry Co., Chicago, has been incorporated with a capital of $10,000. The incorporators are: T. S. Hogan, F. J. Hogan and J. H. Lally.

The Bureau of Yards and Docks of the Navy Department, Washington, will receive bids until April 30 for improving and erecting the 100-ton steel shears at the Boston Navy Yard. Funds available, $19,500.

The American Machine & Mfg. Co., Cleveland, capital $50,000, has been incorporated by Norton T. Horr, C. L. Denton, H. J. Caldwell and H. H. Allyn.

The Foster Steel Stanchion Co., Rochester, N. Y., has been incorporated with a capital of $50,000. The incorporators are: F. H. Battles, C. J. Brown and C. E. Meade, Rochester.

The American Drop Forging & Tool Co., Wayland, N. Y., recently incorporated, has a capital of $15,000, of which $12,000 is paid in. The officers are: W. A. MacFarland, president; Sylvester Dodge, vice president; John J. Morris, treasurer; Julian A. Morris, secretary; A. G. Kruse, superintendent. The company has taken over the business and plant of the American Drop Forging & Tool Co. (partnership), which was started in December, 1902. The company will manufacture the 'American" pipe wrenches, recently patented, Morse taper sleeves and sockets, emery wheel dressers and other machinists' tools; also light drop forgings to order. It has enough orders on hand now to keep double force busy for the next three months. It will purchase a 35-h. p. engine and boiler shortly.

The Ben Steele Weigher Mfg. Co., Peoria, Ill., has been incorporated with a capital of $60,000. Incorporators are: Ben J. Steele, J. W. Ashworth and Edwin Leisher.

The General Engine Co., Buffalo, N. Y., has been incorporated to manufacture engines, pumps, etc. Incorporators are: Robert W. Day, M. W. Fuller and C. P. Reed.

The Morrison Foundry Co., Newark, N. J., has been incorporated with a capital of $10,000. Incorporators are:

James Morrison, Algernon T. Sweeney and Cassimire Scoppettone.

The C. G. Brunnckow Co., Providence, R. I., has been incorporated with a capital of $10,000 to manufacture copper and galvanized iron, cornice work, gutters and conductors. Incorporators are: Joseph Hitz, Emma L. Brunnckow and Louis C. Guenther.

The American Forged Steel Flange Co., Chicago, has been incorporated with a capital of $10,000. Incorporators are: H. L. Hanson, C. J. Schmidt and L. W. Novander.

The Rex Kerosene Engine Co., New York city, has been incorporated with a capital of $100,000. Directors are: R. J. Carter, T. L. Freeman and E. F. McClintock, of New York city.

The J. A. Engle Co., Peoria, Ill., has been incorporated with a capital of $75,000, to manufacture machinery. This corporation embraces the Peoria branch of Reeves & Co., which was recently removed from Springfield.

The Barberie Locomotive Appliance Co., New York, has been incorporated with a capital of $100,000. Incorporators are: John Barberie, 43 Irving place, Brooklyn; Marcie Dunn, 201 Stuyvesant avenue, Brooklyn, and Thomas C. O'Conner, Monroe street, Brooklyn.

Howard Campbell, Sharon E. Jones and Samuel Gaar are organizing a company at Richmond, Ind., to manufacture steel step ladders, steel grill work and other steel novelties. The capital will be $50,000.

The Walton-Von Huffel Mfg. Co. has been organized at Galesburg, Ill., with a capital of $20,000, to conduct a machine shop and foundry business. The new concern is a consolidation of the Walton Mfg. Co. and Von Huffel & Sons. The new company will occupy the building now used by Von Huffel & Sons, which will be remodeled and improved. A portable gasoline engine for general farm use will be added to the products of the company.

Edward McDowell, 145 Ivy street, Atlanta, Ga., is in the market for a 12 x 8 x 10 or 12 duplex outside packed plunger pump and 10-stamp mill of Hall pattern.

E. E. Stouffer, Mineral Ridge, O., is in the market for 100 to 150-h. p. boiler, 25 to 50-h. p. engine, gauges and two pumps; second-hand preferred.

E. J. Codd Co., 700 South Caroline street, Baltimore, wants to buy either new or second-hand rolls to take a plate of steel 12 feet wide and 1¼ inch thick.

The Consolidated Feldspar Co., 223 St. Paul street, Baltimore, is open for proposals for a 50 or 75-ton grinding plant complete.

Vaughan & Fuller, Winchester, Tenn., want an iron planer, 24 x 24 inches by 6 feet; new or good second-hand.

The Country Hydrant Co., Broadway and Pine street, St. Louis, Mo., wants estimates on the construction of galvanized iron and black-iron tanks.

New Construction:—

The Parlin & Orendorff Co., Canton, Ill., manufacturer of agricultural implements, intends to make many additions and alterations to its plant this spring and summer. A 500-h. p. cross compound engine and a 500-h. p. Westinghouse electric generator have been purchased and will soon be installed. A new battery of boilers was added during the winter, giving a total of 1,800 h. p. boiler capacity, and the new electrical unit will give, with the engines already in operation, about 1,600 h. p. engine capacity. The company is also preparing plans and will soon award contracts for the construction of four new buildings, steel construction, to the main plant. Some of these new buildings will replace the older and smaller buildings which have been outgrown. Other changes and the addition of new machinery in various departments, made necessary by the ever-increasing business of the P. & O. Co., will keep this plant among those of the large plow companies of the country. The plant now covers an area of 17 acres and employs from 1,200 to 1,400 men the year round.

The Star Drilling Machine Co., of Akron, O., has contracted for two new buildings for its plant at Chanute, Kan.—a machine shop 60 x 120 feet, two stories, and blacksmith shop 48 x 60 feet, one story. By fall the new buildings will be in operation at a total cost of $75,000 of buildings and machinery.

The Illinois Central railroad will make extensive improvements at Clinton, Ill. A new yard house will be built and the engine, car and carpenter shops will be enlarged. Considerable new machinery will be installed.

The J. B. Foote Foundry Co. has under consideration the removal of its plant from Fredericktown, O., to Newark, O., The company needs more room for building purposes.

The Wishart Mfg. Co., Los Angeles, Cal., which recently announced that it would erect a foundry and window weight plant near Library Park, in that city, is meeting with opposition from citizens who say that they will oppose the erection of a manufacturing plant near the park.

Greenlee Bros., Rockford, Ill., have contracted for the building of a machine shop 160 x 205 feet and an erecting room 38 x 205 feet.

The Wood Railway Signal Co., Fostoria, O., recently incorporated with a capital of $15,000, has organized by electing the following officers and directors: O. V. Wood, J. W. McDonel, T. D. Adams, G. G. Grimes and Roscoe Carle; president, O. V. Wood; vice president, J. W. McDonel; secretary and treasurer, G. G. Grimes Two brick buildings are practically completed and the third has been started.

Within a few days the new addition to the plant of the Indiana Stove Works at Evansville, Ind., will be completed. Two stories have been added to the steel range department, giving 15,000 square feet more floor room.

Fires and Accidents:—

The machine shop of Albert G. Neidinger, Rochester, N. Y., was damaged by fire which occurred on April 5. The main part of the plant was saved.

The large stove foundry of the Wehrle Co., Newark, O., was visited by fire April 7. The destruction of the entire plant was threatened, but the flames were confined to the office, mounting room and steel shop, where $40,000 worth of steel was destroyed. Total loss was about $100,000, covered by insurance. Three hundred men went to work the morning after the fire clearing away the debris.

The Industrial Iron Works, Union City, Pa., were damaged by fire to the extent of $3,000 April 4.

A fire which, it is supposed, was started by a spark from a passing locomotive, occurred April 4 at the plant of the Columbus Chain Co., Columbus, O. The south shop building was burned, as was also the one-story warehouse, but the stock was not damaged to any large extent. The power plant, link room department and north shops were not damaged and were continued in operation. A part of the south shop is already equipped for temporary operation, so that the company will be able to forward, without much delay, some important orders that it has on hand. In a very short time the company will be operating in full. The loss is covered by insurance.

General Industrial Notes:—

Representatives of the Mark Mfg. Co., Chicago, which recently purchased the plant of the Eastern Tube Co., at Zanesville, O., had a meeting a few days ago with the creditors of the Zanesville concern. It is expected that the plant will soon be placed in operation. The Chicago manufacturers made a thorough inspection of the plant. The Board of Trade of Columbus, O., is endeavoring to have the plant move to that city.

The American Car & Foundry Co. will build the 1,100 cars recently ordered by the Pennsylvania railroad at the Detroit plant. The material is now being assembled, but the company will not be able to begin the building of the cars until about June 1. The contract will furnish work for from 600 to 700 men, but it is not expected that the plant will be running to its full capacity for some time.

The Standard Plunger Elevator Co., Jamesville, Mass., has been awarded a contract for installing 103 elevators for the John Wanamaker Co., of Philadelphia. According to the contract 33 of the elevators are to be put in the New York store of the company and the others in its Philadelphia stores.

Since the removal of the foundry and pattern departments from the B. F. Sturtevant Co.'s plant at Jamaica Plain to the extensive new quarters at Hyde Park, Mass., the transfer of the other departments has been in progress. The fan, heater and electrical departments have already been moved and the engine and galvanized iron department are in the process of removal and the erection of the machines in the machine shop

is well under way. These machines and all others in the works will be of the most improved type and these, with the cranes and industrial railways, will enable the work to be turned out rapidly at a minimum cost. The headquarters are still at Jamaica Plain, but in a few months the entire plant will be moved.

Plans have been nearly completed for the consolidation of the Pneumatic Signal Co., of Rochester, N. Y., with a capital of $3,000,000, and the Taylor Signal Co., of Buffalo, with a capital of $800,000. The merged corporations will be known as the General Railway Signal Co., which will have a capital of $5,000,000. The president will be W. W. Salmon, now president of the Taylor Signal Co., of Buffalo; Frederick W. Cook, of Rochester, will be vice president; George D. Morgan, at present secretary and treasurer of the Taylor Signal Co., will probably hold a similar position with the new company. The Buffalo concern manufactures electric signals, while the Rochester company makes mechanical and pneumatic signals. Each company contemplated going into the business of making the product of the other and to avoid conflict and competition, men prominent in the two companies got together and proposed consolidation. The executive and engineering offices of the consolidated companies will be in Buffalo.

The affairs of the Morlock Automobile Mfg. Co., Buffalo, were wound up in bankruptcy court in that city last week. The offer of the directors of the company to pay the creditors 50 cents on the dollar was accepted.

Four years ago the Inland Steel Co., of Chicago, acquired the "indestructible post" patents and commenced the manufacture of the post. This branch of the company's business grew steadily and it has recently been decided to organize a separate company, the Indestructible Post Co., whose incorporation has been noted in these columns. The new company has acquired the post business of the Inland Steel Co., including buildings, machinery, apparatus, equipment, patents, good will and a free lease of the land now occupied. The post consists of a base of manufactured stone formed upon the steel upright under great pressure. The upright is of high carbon angle steel punched to suit any kind of wire fence and coated with asphaltum. The plant is located at Chicago Heights, Ill., and is running full time. A large number of orders are on hand, including one for 40,000 posts from the Cincinnati, Bluffton & Chicago Railroad Co.

The National Wire Cloth Co., of Chicago, has signed a contract with the Business Men's Association, of Niles, Mich., whereby the company will move to Niles and expend $25,000 per year in wages, while the Business Men's Association will provide a building rent free.

The Edwards Headlight Co., Cincinnati, will move to Logansport, Ind. The city provides the company with a building.

Receiver Strauss has closed the plant of the Model Gas Engine Co., Auburn, Ind., pending a settlement with creditors. An inventory by the receiver shows assets $316,478.75 and liabilities $267,528.93.

An order has been issued for a resumption of full working time by car workers employed by the New York, New Haven & Hartford railroad. This order restores for 300 employes the ten-hour day schedule which was in force prior to Jan. 23, on which date the time was reduced to nine hours and was followed on Feb. 13 by a reduction to eight hours.

The boiler manufacturing plant of William Allen & Sons Co., Worcester, Mass., has been placed in operation by the receivers. The contracts which are on hand will be finished.

The foundry of the Reeves Pulley Co., Columbus, Ind., incorporated a few months ago as the American Foundry Co., has been closed for an indefinite period, during which castings for the pulleys will be made at another foundry in that city.

The Detroit Screw Co. has decided to move its principal office from Chicago to Detroit. This company absorbed the Pearson Mfg. Co. about four months ago. The Pearson company was a Chicago concern. At the annual meeting held a few days ago W. B. Pearson was elected president to succeed C. E. Roberts. It was then decided to move all the Chicago property to Detroit, making the latter city the headquarters.

Alabama cast iron pipe makers are figuring on getting a share of the order which will soon be given for the waterworks at Cienfuegos, Cuba. A representative of the United States Cast Iron Pipe & Foundry Co. has just returned from Cuba, where he went on business in connection with this contract. The following material will be needed: Cast iron pipe, 24 inches and over in diameter, 10,441 tons; 185 tons of special castings; 279 valves, 24 inches in diameter; 130 hydrants; 345 tons structural steel; 11,235 square yards expanded metal, and 330,000 pounds of lead.

Julien Grear is preparing to establish a machine shop at Paducah, Ky. He has placed a number of orders for machinery.

The Neely-Ralya Co., of Greenfield, O., manufacturer of the Neely saw, has been conferring with the Merchants' Association of Anderson, Ind., concerning the removal of the plant from Greenfield to Anderson.

Negotiations have been completed whereby the plant of the Chicago Steel Mfg. Co., at Hammond, Ind., will be moved to Newcastle, Ind. The old plant, which was recently damaged by fire, had a capacity of 300,000 kegs of iron and steel nails per year.

The Parkersburg Rig & Reel Co. is a corporation organized under the laws of West Virginia, with an authorized capital of $50,000, $20,000 of which is paid in, and it has a surplus of $30,000. The officers of the company are: C. C. Chamberlin, president, and John M. Crawford, secretary and treasurer. The company has been in operation almost seven years, manufacturing rig irons, wooden tanks, for oil and water, and drilling machines, having had a very nice trade in each of these lines. The business has grown to very fair proportions, the sales averaging over $250,000 every year. The company ships its goods all over the United States wherever oil and gas are found, and has sent five of its drilling machines to Nome, Alaska, where they are boring for gold. The outlook in its line of business seems very good for the remainder of the year.

A doubling of its capital stock, which has been $1,000,000, is announced by Crocker-Wheeler Co., manufacturer and electrical engineer, of Ampere, N. J. The company, which is the largest of the independent electrical manufacturers, was organized in 1892 by Dr. Schuyler Skaats Wheeler and Prof. Francis B. Crocker, on a relatively modest basis. It now has fifteen branch offices from Boston to San Francisco and does one of the largest businesses in the world in electric power apparatus. The capitalization was several times increased, until in 1899 it had become $1,000,000. In view of the rapidly expanding business the stockholders have now decided to increase this amount to $2,000,000.

Bertsch & Co., Cambridge City, Ind., manufacturers of punches, shears, bending rolls, etc., are running to full capacity. This concern, with the exception of one day, has not shut down for twenty years save on holidays.

The Atlantic Machine Works, Westminster, Md., manufacturers of labeling machines, have erected a commodious building equipped with modern machinery and have begun the manufacture of their specialties. The company was organized last year, but on account of a suit alleging infringement of patents, it has been delayed in beginning operations. The suit was won by the company and it then began to equip its plant. The erection of additional buildings in the fall is contemplated. The plans are not yet definitely settled.

The White Engineering Co., Marion, O., recently incorporated, has already a small plant which is operated by electricity. The company manufactures a valve gear, an air saw and a lime and sediment extractor. The company owns all its patents.

The Acme Foundry Co., Brooklyn, N. Y., recently incorporated, succeeds a partnership which has been in existence the past four years. The company will operate a jobbing foundry in brass and iron.

The Mahoning Motor Car Co., Youngstown, O., recently incorporated for the manufacture of automobiles, is equipping a machine shop. This equipment has been purchased.

Luis Jackson, industrial commissioner of the Erie Railroad Co., has issued an industrial map of the Erie system. The company's lines traverse the states of New York, New Jersey, Pennsylvania, Ohio, Indiana and Illinois, all comprising a territory rich in resources and enterprise, and the map shows the great extent of the system and the important business centers reached by the railroad. The map is in colors, showing the bituminous and anthracite areas in red, oil and gas in yellow, and the coal, oil and gas area in orange.

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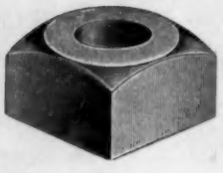

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